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Energy Alberta 1987

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Energy Resources Conservation Board
Review of Alberta Energy Resources in 1987

ERCB
WORKING WITH
ALBERTANS FOR 50 YEARS

ERCB

Cover Photo:

Harvesting non-renewable resources can be a fleeting thing. Time takes its toll. Ghosts of past wealth are captured in this photo of a rail loading facility at an abandoned coal mine near Nordegg, in west central Alberta.

Glen Brosinsky - ERCB.

Although the back half of this year's **Energy Alberta** is a report on the state of the industry in 1987, historical photos have been used throughout to assist the reader in gaining an overall impression of how far the Province has come in developing its energy resources.

ERCB 88-40

ISSN 0825-1525

Energy Alberta

Each year **Energy Alberta** reviews energy developments within the Province seeking to place them within the context of both Canadian and world trends and developments. In addition to presenting statistical data not readily available elsewhere this publication tries to provide some insights into what the data means for the people of Alberta, in both human and financial terms.

Energy Alberta is published by the Energy Resources Conservation Board. The ERCB is an independent body which — in the words of its mission statement — "strives to facilitate and regulate the responsible development and careful conservation of Alberta's energy resources. In so doing, the ERCB attempts to bring fairness and a sense of balance to the conflicting needs, concerns and perceptions of the people of Alberta, their government and the energy industry."

The editors of and contributors to **Energy Alberta - 1987** trust that they have in some measure succeeded in explaining this complex mission. As always, we welcome and encourage reader input to help make future editions even more interesting and useful. Please write: Editor, Energy Alberta, 10th Floor, 640 - 5 Avenue, S.W., Calgary, Alberta, T2P 3G4.

Oil

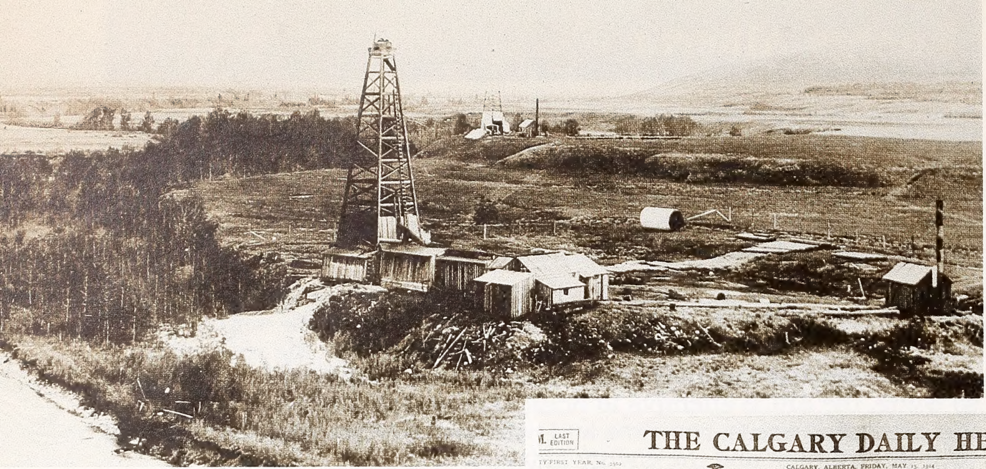
Gas

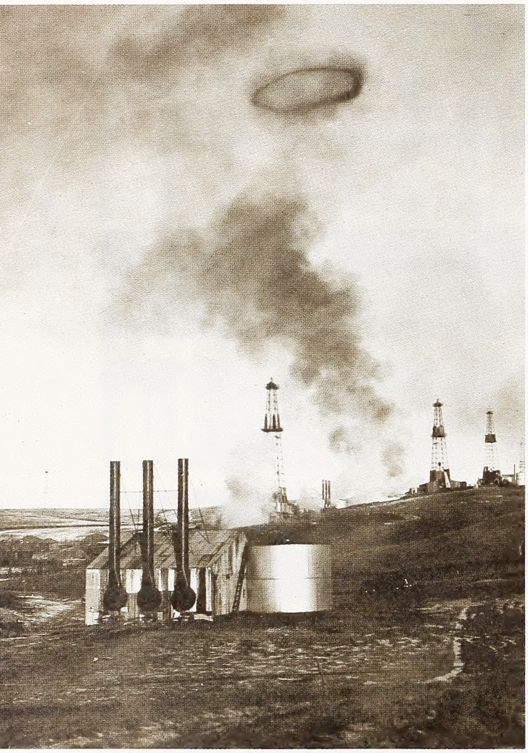
Oil Sands

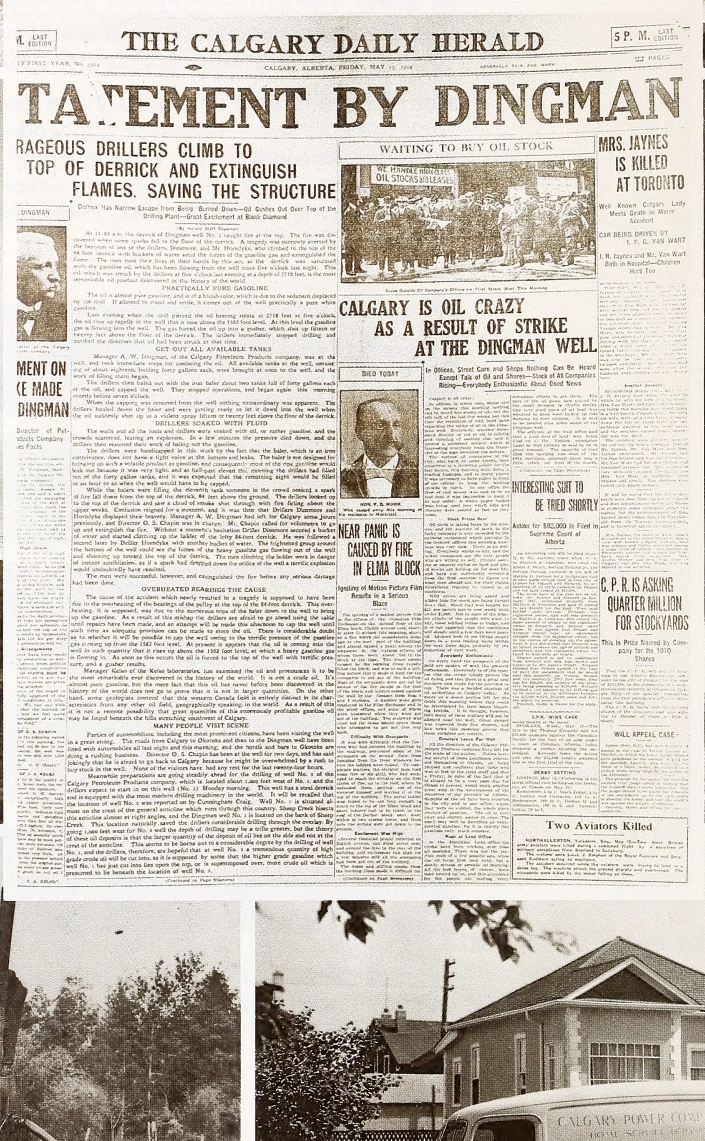
Coal

Hydro

Each of the colour bars above relates to a specific energy resource as shown. These same colours are used in charts throughout the publication as an assist to the reader.







M. LAST EDITION

THE CALGARY DAILY HERALD

5 P. M. LAST EDITION

TY-FIRST YEAR, No. 2563

CALGARY, ALBERTA, FRIDAY, MAY 15, 1914

GENERALLY FAIR AND WARM

22 PAGES

TA EMENT BY DINGMAN

RAGEOUS DRILLERS CLIMB TO TOP OF DERRICK AND EXTINGUISH FLAMES, SAVING THE STRUCTURE

Derrick Has Narrow Escape from Being Burned Down—Oil Gushes Out Over Top of the Drilling Plant—Great Excitement at Black Diamond

(By Herald Staff Reporter)

At 11.40 a.m. the derrick of Dingman well No. 1 caught fire at the top. The fire was discovered when some sparks fell to the floor of the derrick. A tragedy was narrowly averted by the heroism of one of the drillers, Dinsmore, and Mr. Horndyke, who climbed to the top of the 84 foot derrick with buckets of water amid the fumes of the gasoline gas and extinguished the flame. The men took their lives in their hands by this act, as the derrick was saturated with the gasoline oil, which has been flowing from the well since five o'clock last night. This oil which was struck by the drillers at five o'clock last evening at a depth of 2718 feet, is the most remarkable oil product discovered in the history of the world.

PRACTICALLY PURE GASOLINE

The oil is almost pure gasoline, and is of a bluish color, which is due to the sediment displaced by the drill. If allowed to stand and settle, it comes out of the well practically a pure white gasoline.

Last evening when the drill pierced the oil bearing strata at 2718 feet at five o'clock, the oil rose so rapidly in the well that it rose above the 1562 foot level. At this level the gasoline gas is flowing into the well. The gas forced the oil up into a gusher, which shot up fifteen or twenty feet above the floor of the derrick. The drillers immediately stopped drilling and notified the directors that oil had been struck at that time.

GET OUT ALL AVAILABLE TANKS

Manager A. W. Dingman, of the Calgary Petroleum Products company, was at the well, and took immediate steps for confining the oil. All available tanks at the well, consisting of about eighteen, holding forty gallons each, were brought at once to the well, and the work of filling them began.

The drillers then baled out with the iron baler about two tanks full of forty gallons each of the oil, and capped the well. They stopped operations, and began again this morning shortly before seven o'clock.

When the capping was removed from the well nothing extraordinary was apparent. The drillers hauled down the baler and were getting ready to let it down into the well when the oil suddenly shot up in a violent spray fifteen or twenty feet above the floor of the derrick.

DRILLERS SOAKED WITH FLUID

The walls and all the tools and drillers were soaked with oil, or rather gasoline, and the crowds scattered, fearing an explosion. In a few minutes the pressure died down, and the drillers then resumed their work of baling out the gasoline.

The drillers were handicapped in this work by the fact that the baler, which is an iron contrivance, does not have a tight valve at the bottom and leaks. The baler is not designed for bringing up such a volatile product as gasoline, and consequently most of the ripe gasoline would leak out because it was very light, and at half-past eleven this morning the drillers had filled ten of the forty gallon tanks, and it was expected that the remaining eight would be filled in an hour or so when the well would have to be capped.

While the balers were filling the eleventh tank someone in the crowd noticed a spark of fire fall down from the top of the derrick, 84 feet above the ground. The drillers looked up to the top of the derrick and saw a cloud of smoke shot through with fire furling about the upper works. Confusion reigned for a moment, and it was then that Drillers Dinsmore and Horndyke displayed their bravery. Manager A. W. Dingman had left for Calgary some hours previously, and Director O. S. Chapin was in charge. Mr. Chapin called for volunteers to go up and extinguish the fire. Without a moment's hesitation Driller Dinsmore secured a bucket of water and started climbing up the ladder of the lofty 84-foot derrick. He was followed a second later by Driller Horndyke with another bucket of water. The frightened group around the bottom of the well could see the fumes of the heavy gasoline gas flowing out of the well and shooting up toward the top of the derrick. The men climbing the ladder were in danger of instant annihilation, as if a spark had dropped down the orifice of the well a terrific explosion would undoubtedly have resulted.

The men were successful, however, and extinguished the fire before any serious damage had been done.

OVERHEATED BEARINGS THE CAUSE

The cause of the accident which nearly resulted in a tragedy is supposed to have been due to the overheating of the bearings of the pulley at the top of the 84-foot derrick. This overheating, it is supposed, was due to the numerous trips of the baler down to the well to bring up the gasoline. As a result of this mishap the drillers are afraid to go ahead using the cable until repairs have been made, and an attempt will be made this afternoon to cap the well until such time as adequate provision can be made to store the oil. There is considerable doubt as to whether it will be possible to cap the well owing to the terrific pressure of the gasoline gas coming up from the 1562 foot level. At present it appears that the oil is coming into the well in such quantity that it rises up above the 1562 foot level, at which a heavy gasoline gas is flowing in. As soon as this occurs the oil is forced to the top of the well with terrific pressure, and a gusher results.

Manager Kelso of the Kelso laboratories has examined the oil and pronounces it to be the most remarkable ever discovered in the history of the world. It is not a crude oil. It's almost pure gasoline, but the mere fact that this oil has never before been discovered in the history of the world does not go to prove that it is not in larger quantities. On the other hand, some geologists contend that this western Canada field is entirely distinct in its characteristics from any other oil field, geographically speaking, in the world. As a result of this it is not a remote possibility that great quantities of this enormously profitable gasoline oil may be found beneath the hills stretching southwest of Calgary.

MANY PEOPLE VISIT SCENE

Parties of automobilists, including the most prominent citizens, have been visiting the well in a great string. The roads from Calgary to Okotoks and then to the Dingman well have been lined with automobiles all last night and this morning, and the hotels and bars in Okotoks are doing a rushing business. Director O. S. Chapin has been at the well for two days, and has said jokingly that he is afraid to go back to Calgary because he might be overwhelmed by a rush to buy stock in the well. None of the visitors have had any rest for the last twenty-four hours.

Meanwhile preparations are going steadily ahead for the drilling of well No. 2 of the Calgary Petroleum Products company, which is located about 1,000 feet west of No. 1, and the drillers expect to start in on this well (No. 2) Monday morning. This well has a steel derrick and is equipped with the most modern drilling machinery in the world. It will be recalled that the location of well No. 2 was reported on by Cunningham Craig. Well No. 1 is situated almost on the crest of the general anticline which runs through this country. Sheep Creek bisects this anticline almost at right angles, and the Dingman well No. 1 is located on the bank of Sheep Creek. This location naturally saved the drillers considerable drilling through the overlay. By going 1,000 feet west for No. 2 well the depth of drilling may be a trifle greater, but the theory of these oil deposits is that the larger quantity of the deposit of oil lies on the side and not at the crest of the anticline. This seems to be borne out to a considerable degree by the drilling of well No. 1, and the drillers, therefore, are hopeful that at well No. 2 a tremendous quantity of high grade crude oil will be cut into, as it is supposed by some that the higher grade gasoline which well No. 1 has just cut into lies upon the top, or is superimposed over, more crude oil which is presumed to lie beneath the location of well No. 2.

(Continued on Page Nineteen)

. DINGMAN

rector of the Calgary roducts company.

MENT ON (E MADE DINGMAN

Director of Petroducts Company ves Facts

WAITING TO BUY OIL STOCK

Scene Outside Oil Company's Offices on First Street West This Morning

CALGARY IS OIL CRAZY AS A RESULT OF STRIKE AT THE DINGMAN WELL

In Offices, Street Cars and Shops Nothing Can Be Heard Except Talk of Oil and Shares—Stock of All Companies Rising—Everybody Enthusiastic About Good News

Calgary is oil crazy!

DIED TODAY

HON. F. D. MONK

Who passed away this morning at his residence in Montreal.

NEAR PANIC IS CAUSED BY FIRE IN ELMA BLOCK

Igniting of Motion Picture Film Results in a Serious Blaze

(Continued on Page Seventeen)

MRS. JAYNES IS KILLED AT TORONTO

Well Known Calgary Lady Meets Death in Motor Accident

CAR BEING DRIVEN BY I. S. G. VAN WART

J. R. Jaynes and Mr. Van Wart Both in Hospital—Children Hurt Too

INTERESTING SUIT TO BE TRIED SHORTLY

Action for $82,000 Is Filed in Supreme Court of Alberta

C.P.R. WINS CASE

DERBY BETTING

C. P. R. IS ASKING QUARTER MILLION FOR STOCKYARDS

This Is Price Named by Company for Its 1010 Shares

WILL APPEAL CASE

Two Aviators Killed

NORTHALLERTON, Yorkshire, Eng., May 15.—Two more British army aviators were killed during a combined flight by a squadron of military aeroplanes from Scotland to Salisbury.

The victims were Lieut. J. Empson of the Royal Fusiliers and Sergeant Cudmore acting as mechanic.

The accident occurred while the aviators were trying to land in a dense fog. The machine struck the ground sharply and overturned. The occupants were killed by the motor falling on them.

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Metric/Imperial Energy Equivalents

Oil
1 cubic metre = 6.3 barrels
Natural Gas
1 cubic metre = 35.3 cubic feet
Coal
1 tonne = 0.98 long ton (2240 pounds) = 1.1 short ton
Distance
1 kilometre = 0.621 miles
Energy
1 petajoule = energy equivalent of 164 000 barrels of crude oil
= energy equivalent of 1 billion cubic feet of gas

In this collage of photos the reader may gain a sense of the excitement, the difficult work, the environmental hazards and, finally, the progress that came out of development of Alberta's energy resources.

A Message from the Premier

As you know, 1988 marks the fiftieth anniversary of the Alberta Energy Resources Conservation Board. I am delighted to take this opportunity to congratulate Board Members and staff for the high standards the Board has maintained throughout its existence.

From its inception in 1938, the Board quickly became recognized for its expertise with regard to the oil and gas industry. Based on that expertise, the Board assisted in the development and implementation of a regulatory framework for the expansion and development of the Alberta oil and gas industry. The Board's exemplary performance made it the model for other regulatory agencies, including the National Energy Board.

The ERCB currently performs vital functions in implementing the regulatory framework for the conventional oil and gas industry and in making recommendations for major energy developments within the province. With its expanded responsibilities the ERCB continues to enjoy a well earned reputation for expertise and sound regulatory judgements.

Once again, I congratulate the ERCB Board Members and staff, past and present, on fifty years of excellent service to the Province of Alberta.

Sincerely,

Don R. Getty

Don R. Getty
Premier of Alberta

A Message from ERCB's Chairman

1988 marks a special year for the Energy Resources Conservation Board. It was 50 years ago this summer that the Petroleum and Natural Gas Conservation Board (as it was then called) was formed.

The Board is marking the anniversary in a number of ways. One is to include an historical theme in this edition of **Energy Alberta**, along with our annual review of energy activity in the province.

The historical articles do not, of course, tell the full story of the Board's 50 years. Those seeking greater detail will enjoy the forthcoming book on the Board's history which is currently being written by noted western historian Dr. David Breen.

Those who have observed the Board over the years can point to changes in the organization, and in what it does and how it does it. True, there have been changes. However, as one who has had the pleasure of being associated with the Board for nearly two-thirds of its 50 years, I believe they have not been fundamental changes, but only those necessary to meet the very different kinds of challenges which have been presented to us over the years.

Many of the problems we deal with today were only faintly perceived 40 or 50 years ago, even by the far-sighted people who founded the Board. Yet, our core task of encouraging the development of Alberta's energy resources — in both a responsible manner, and for the benefit of all Albertans — remains as valid and challenging today as it ever was.

If I may be given some latitude on this special occasion, I would like to suggest that, in my view, the Board has been successful in its service to the people of this province. This success has resulted from the efforts of many. I would be remiss if I failed to mention the leadership provided the organization by the late Ian McKinnon, the late "Red" Goodall, and by Dr. George Govier and the recently-retired Vern Millard. I am sure that each of them, as a past Chairman, would have agreed with me that the organization's success has been rooted primarily in the dedicated service of the thousands of men and women who have worked with the Board during the past 50 years. They are the real story of this organization.

On behalf of the past and current Board Members, I wish to thank all ERCB staff. On this special occasion, we dedicate this anniversary edition of **Energy Alberta** to you. You made it all possible.

Sincerely,

GJDeSorcy

G. J. DeSorcy
Chairman

Important Events of 1987

...the changing world of Alberta energy

1987 proved to be a year of cautious consolidation for Alberta's energy industry, which experienced generally better oil prices than in 1986, but lower prices for natural gas. From a producer's point of view, some optimism regarding gas prices may be warranted, as events in the United States during the past winter suggest that the U.S. "gas bubble" may finally be nearing its end. While waiting for markets to stabilize, the industry worked to improve the cost efficiency of existing projects as well as proceeding with the planning necessary for major projects destined to come on-stream in 5 to 10 years. It is anticipated that markets will have improved and prices will have moved higher by that time. Energy industry investment in 1987 moved modestly higher than 1986, but remained nearly $2 billion below record 1985 levels.

Government Policy Initiatives

Most policy initiatives by the Government during 1987 focussed on maintaining the momentum for gas production and price deregulation, and on streamlining the participation by private individuals in power production. Throughout the year the Government requested the ERCB to review a number of major public policy issues. Among the more important of these were:

- a review of Alberta's gas surplus procedures and definition of the Core Markets (see page 32 for additional details)
- a review of Alberta's ethane policy (see page 34 for additional details)
- the holding of an Inquiry into Small Power Production in the province (see page 40 for additional details)

The Government also made some broad changes to the Natural Gas Royalty System. The revised system relates the royalty payable on gas production to an average province-wide market price and limits the level of price discounting to 80 per cent of the average price for purposes of royalty collection. With the announcement of the royalty review the Government also alerted the industry that it intended to simplify the gas cost allowance mechanism and the Alberta Royalty Tax Credit in the coming year.

Crude Oil Prorationing

At the request of the oil industry, the ERCB introduced a Modified Crude Oil Proration Plan (MPP), effective 1 June 1987. The MPP was designed to permit oil producers unrestricted access to markets while, at the same time, providing all producers with some assurance that they will be able to sell a predetermined minimum level of production. In November 1987, on the basis of very positive results during the first 5 months of operation, the Board announced that the MPP would be continued indefinitely. It was already obvious that the new plan was making it possible for producers and shippers of crude oil to arrange for purchase and transportation earlier than was possible under the old prorationing system. Questions remain regarding the effectiveness of the MPP during periods of market or pipeline constraint and these matters are being examined by an ERCB/Industry Task Force charged with further improving the MPP and with reducing its complexity.

Crude Oil Supply

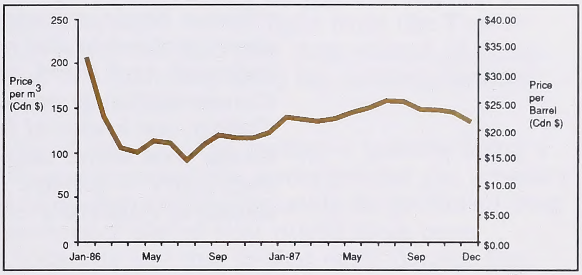
Very likely as a result of such initiatives as the MPP, as well as drilling incentives generated by royalty holidays, the industry sustained a surprisingly high level of production from conventional pools in the second half of 1987. This is particularly evident from the substantial contribution of production from new wells versus overall production throughout the year. As well, the productivity of older wells declined at a slower rate over the past year.

Natural Gas Prices and Markets

With the gradual removal of regulatory impediments in both Canada and the United States, the natural gas industry is entering a new era of free market operation. Market forces are becoming the major factors in determining supply, demand and prices. The oversupply of natural gas in the United States, which caused prices to tumble in the past 2 years, now is beginning to diminish. This should result in higher prices for Alberta's exports over the next several years.

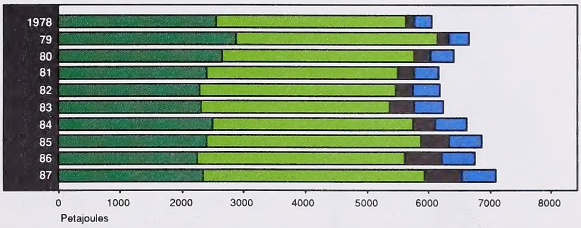
1. Alberta Weighted Average Field Price Light and Medium Oil

During much of 1987 crude oil prices rose slightly and stabilized in the $20-plus range per barrel (Cdn), although prices fluctuated within this range.



2. Alberta Hydrocarbon Energy Resources
10-year production

- Oil
- Gas
- Oil Sands
- Coal



Looking Back on the ERCB's 50 Years

The game and playing fields have changed but the principles have remained the same

While working on this review of ERCB's 50 years as regulator of the Alberta energy industry, we were privileged to have a conversation with a man who was involved in setting up the Board back in 1938. Ernest Manning served Alberta as its Premier from 1943 through 1968, going on then to become a distinguished member of the Canadian Senate. When the Petroleum and Natural Gas Conservation Board — the forerunner of the present-day ERCB — first was formed, Mr. Manning was serving in William Aberhart's Social Credit Government as Minister of Trade and Industry. He graciously provided a 50-year look back at the Board: at how it began and how it has evolved in its service to Albertans. His comments appear in italics throughout this article, adding unique insights to our review of the ERCB down through the years.

The Board was Founded on Three Principles

Ernest Manning remembers

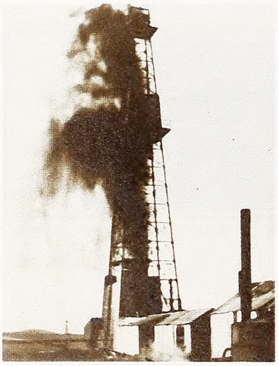
"I believe the Board and its people should take great satisfaction from the fact that the principles upon which the Board was founded 50 years ago are just as valid and useful today, and for the foreseeable future.

"Those basic principles were three in number. First, to encourage development of the resources. Secondly, to protect the public interest. And third, to ensure that the resources are not wasted. Conservation is even more important now than it was in 1938. Today, we know of finite limits to many of the fossil fuels, and we know that some day — perhaps far off, but certainly some day in the future — we are going to face shortages. Avoiding unnecessary waste of Alberta's energy resources just makes common sense."

Pay Dirt at Turner Valley ...It All Began With Wasted Resources

With a roar heard throughout the Valley, thousands of feet of drilling fluid blew out and light green crude oil sprayed the drilling rig. It was 16 June 1936 and Turner Valley Royalties No. 1 had struck pay dirt.

This was the biggest oil discovery in the British Empire at the time and it set off a wave of stock speculation in Calgary, and unprecedented prospecting in the Valley. It was the third such boom in Turner Valley's short but colourful history, starting with the first discovery there in 1914.



Royalties No. 1 hits pay dirt!
June 1936 - Turner Valley.

Local and international investors flocked to Alberta, keen to share in the lucrative exploration for oil and natural gas. But this time a new player entered the energy arena, for the Alberta Government was eager to reduce the huge waste of natural gas which had been going on for years in the Turner Valley Field. Even back 50 years ago, a growing number of people had begun to recognize that serious damage already had been done to the Valley's oil reservoir, and much of the potential of the oilfield had been lost forever, largely through a lack of understanding.

Within days Calgary's downtown streets become cluttered with signs urging speculation, and with speculators seeking wealth.

As far back as 1931, the Public Utility Commissioners had been told that one-third to one-half of the gas reserves in the Turner Valley Field already had been flared during the previous 7 years — a staggering 260 billion cubic feet. While many Calgarians boasted of being able to read newspapers at night by the light from the Turner Valley flares 30 miles away, others worried that their source of cheap, convenient and efficient fuel — which they used for cooking, heating and lighting — would soon be gone.

What wasn't really understood was that the flaring — besides being a highly visible waste — also was lowering the underground gas pressure and reducing the amount of oil that could ultimately be produced from the field. Perhaps three-quarters of the oil that might have been recovered by today's methods was lost due to that early flaring. But, back then, only a very few people had begun to understand how the gas pressure was providing the oil reservoir with the energy needed to drive the oil to the surface.

Throughout the 1920s and 1930s, industry and government had tried to work out some form of voluntary agreement to conserve the Turner Valley gas. However, despite many meetings and endless debate no voluntary agreement ever had been reached. In those early years the notion that government should regulate development and production was opposed by many people. Free enterprisers argued that — having leased the mineral rights and invested the money — developers should be free to act as they thought best, in much the same way that farmers were said to be free to develop their lands to meet their own interests.

Over time, however, more and more Albertans had come to realize that the province's energy resources were not inexhaustible. It was then only a short step to the idea that energy development should be orderly and efficient, with due regard for the needs of future generations. And this, in turn, led to a growing acceptance of the principles of resource conservation. However, an independent arbitrator still was needed, for there remained a widespread distrust between the "theoretical" university-trained petroleum engineers and the "practical" oilmen working out in the Valley, and their differing viewpoints somehow had to be reconciled. In those earlier years, the practical oilmen were far from convinced that the academics knew what they were talking about when it came to finding and producing oil.

First Board dates back to 1932

In 1932, the United Farmers of Alberta — the provincial government of that day — moved to establish what was known as the Turner Valley Gas Conservation Board (TVGCB) to address the problems already showing themselves in the Turner Valley Field. The TVGCB was a first tentative step towards more prudent energy management. Sadly, this forward-thinking initiative soon was crushed by external forces. The main objective of that early Board was to distribute Turner Valley production fairly among the operators, and to avoid squandering the underground reservoir pressure so that more oil could be recovered over the long term. Indeed, the new Board did order Turner Valley operators to cut back on production at individual wells as it attempted to gain control of what was fast becoming a chaotic situation.

However, the problem facing the TVGCB was that only the larger oil companies could afford to defer income over the short term in return for greater long-term gains. The smaller producers were much more dependent on regular monthly income. In many instances — or so it was claimed — the new Board's production cuts threatened the smaller companies with bankruptcy. In due course, that early Board was taken to court by one small producer, possibly acting on behalf of many others. He had been ordered to cut back production from 90 to less than 5 barrels per day, and he claimed it would ruin him financially.

The Great Depression, with Alberta's only bright spot being work in the Turner Valley Field.

After a lengthy legal battle the Supreme Court of Canada decided in favour of the Alberta Government — ruling that the Conservation Board could continue to operate. However, they also ruled that the production cutbacks imposed by the Board could not infringe on any mineral leases issued by the Federal Government before ownership of the resources had been transferred to Alberta in 1930. Obviously, the TVGCB had won a hollow victory. Without equal application to all producers in the field the Board's production cutbacks would be unworkable. Soon, both the production cutbacks and that early Board were abandoned, to the ultimate detriment of the Turner Valley Field.

It should be remembered, though, that this was the time of the Great Depression. With the collapse of wheat prices in 1932, and the years of drought from 1933 to 1937, the drilling and production activity in the Turner Valley had become one of the few bright spots in Alberta's otherwise blighted economy. Many people petitioned the Alberta Government not to threaten oil and gas investment activities or place at risk the jobs generated by Turner Valley drilling and production.

Despite these entreaties, however, the seeds of change already were germinating, and not just in the wheat fields, where 1938 witnessed a bumper crop.

Mr. Manning recalls: "Before the first Social Credit Government was elected in 1935, the terrible wastage of natural gas in Turner Valley had become a major public concern. I remember the late Mr. Aberhart (William Aberhart, Alberta's Premier from 1935 through 1943) dealing with this at some length during the 1935 election campaign. Shortly after he was elected, Mr. Aberhart began seeking someone knowledgeable about the oil industry who could get control of the resource waste. He appointed Charlie Ross, a Calgary oilman, as his first Minister of Mines and Minerals. Charlie Ross didn't have any interest in politics, but he did know a good deal about conservation.

On the pathway to Premier! William Aberhart (centre), with Ernest Manning on his right, during the 1935 election campaign.

"The basic problem facing Charlie Ross was that Turner Valley was a naphtha field. The wells being drilled in the Valley produced a great deal of gas, but only a relatively small amount of oil. But it was that by-product — the oil — that the companies really wanted. Other than the Calgary market, there was no place to sell their gas. As a result, they simply flared it, burning off huge volumes of a non-renewable resource, and losing it for all time."

By 1938, however, the issue was no longer just the flaring of the gas. For more than a year Alberta's oil production had been greater than market demand for it. It had become obvious that some form of control would be required if markets were to be shared equitably among both large and small producers, for many of the smaller producers had no ready access to the marketplace. The spectre of the chaotic marketing situation that had almost destroyed the Texas oil industry now loomed over Alberta, with the potential of loss to producers, investors and the people of Alberta, as owners of the resource.

"Shortly after he took office as Minister of Mines and Minerals, Charlie Ross came up with a pretty drastic program to progressively close in any Turner Valley wells that couldn't market their gas. Furthermore, he planned on doing it over a rather short period of time. While his proposal would have hurt the large integrated producers, that hurt wouldn't have been mortal. However, there's little doubt that it would have put many of the smaller producers out of business. Certainly, that's what they argued. Although Mr. Aberhart strongly supported Charlie's conservation program, he felt it should be phased in over a longer period of time to give the producers a chance to adjust. He and Charlie Ross got into a disagreement over this and Charlie resigned. His parting comment was, 'If you're going to cut off the dog's tail, you do it all at once. You don't do it an inch at a time!'."

Premier Aberhart finally wins!

July 1938 and the Board opens for business as a tenant in Calgary's telephone building.

Premier Aberhart, however, did not withdraw from the issue. Instead, he regrouped for another attack, but by a different route. He petitioned the Federal Government to amend the clause in the 1930 Resource Transfer Act that had spelled doom for the previous Board. This time the Federal Government agreed, perhaps because it now realized that the larger oil companies would not invest in Western Canada without controls over development and production.

Both government and industry now actively sought to avoid a situation where those who could sell their production were drawing off the oil or natural gas from beneath neighbouring wells that were shut in for lack of markets. This was happening at that time in both Texas and California. The co-operative approach finally paid off. In April 1938, the Alberta government was able to create a new Board — one with real power — and thus was born the Petroleum and Natural Gas Conservation Board (PNGCB), the organization we know today as the Energy Resources Conservation Board. The first three-man Board and its 7 employees began work on 2 July of that year, operating from the second floor of the Alberta Government Telephone building in downtown Calgary.

A new era in the management of Alberta's energy resources had been launched!

A Decade of Learning Begins ...with Turner Valley as the Classroom

Competency and Conservation were the key words

"Our idea in setting up the Board was to have a regulatory body of competent people to deal with this difficult question of conservation and, so far as possible, to have them divorced from political influences. To our minds, conservation and development decisions had to be made on engineering factors only, not on political factors. The ground rules the government laid down for the new Board were: first, get the maximum production possible and encourage investment and development; second, get a fair return for the public, as owners of the resource; and third, eliminate waste, so far as that may be physically possible. Those ground rules are as appropriate today as they were in 1938. Both they and the Board have stood the tests of time.

Board's first chairman, U.S. conservation expert, W. Knode.

"The problem the government faced in finding a chairman for the new Board was that we were reluctant to take someone from the Alberta industry because of the historical division between the major companies and the smaller producers. It seemed almost impossible to get a man from either group that the other one would not regard as having a bias. We started hunting around in the United States. We were making a lot of contacts in those days with the oil-producing states of Oklahoma and Texas because we were trying to develop regulations for the new Board and there was nothing in Alberta's experience to use as a model. Mr. Aberhart asked Eldon Tanner to look for a suitable person (Mr. Tanner had succeeded Charlie Ross as Minister of Mines and Minerals) and Mr. Tanner came up with Bill Knode, who had served with the Texas Railroad Commission and was considered to be an expert on conservation."*

Jimmy Frawley, a lawyer out of the Alberta Attorney General's Department, had worked on drafting the legislation establishing the PNGCB and he became, technically, the Board's first chairman, serving for a few months until Bill Knode took over in the fall of 1938.

In retrospect very wisely, the Alberta government created a quasi-judicial Board having significant differences from its American counterparts. For example, in Alberta the Board members were appointed, rather than elected as in Texas, making them far less susceptible to short-term political factors. Additionally, the Alberta Board was kept very much at "arm's length" from the Government, being created "a body politic and corporate" rather than a Government department, with its offices quite deliberately set up in Calgary, conveniently close to the centre of the province's petroleum industry, yet well away from the seat of government in Edmonton. Another significant difference was that the budget for the Board's activities was drawn from equal contributions by the government and by the industry being regulated, a process largely still in effect today.

From its very beginnings, the new Petroleum and Natural Gas Conservation Board sought the co-operation of the petroleum industry in carrying out its mandate. By offering technical expertise they attempted — largely through persuasion — to convince producers of the benefits of orderly and efficient production practices. The first order actually issued by the new Board was to restrict the spacing of wells in Turner Valley to one every 40 acres, although the Valley never had been as chaotically crowded with derricks and wells as were the oil fields of west Texas and California.

Turner Valley in the late 1930s. Early signs of rigs crowding to get a share of the action.

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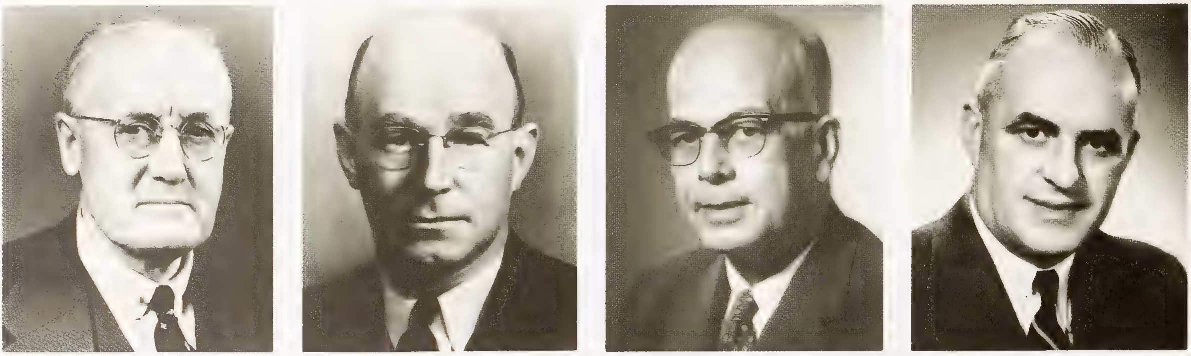
* The Texas Railroad Commission was, and is to this day, the regulatory body for the Texas oil industry.

Robert Allen, the Board's second chairman; fighting to be a conservationist in wartime.

WW II changed everything

Although production of oil in the Turner Valley had exceeded demand in 1937, the beginning of the Second World War, in 1939, almost immediately reversed that situation. Considerable pressure was exerted on the Board at that time to allow production levels that were definitely not in the best interests of conservation. By that time, Bill Knode had resigned as Board Chairman and had been replaced by another American, Robert E. Allen. Allen soon realized that Ottawa meant to have Alberta's oil for the war effort, by whatever means necessary. Thus it came about, in the darkest days of the war, that the Turner Valley Field was pressed hard to help provide the fuel necessary to meet a war effort that was expanding on many fronts. For perhaps the first and only time, the nation's strategic considerations were allowed to deflect the Board's Alberta objectives. As a formal protest, Robert Allen posted both the maximum production rate for the Turner Valley Field, and the proper rate for good conservation. The two sets of figures were quite different and the message was not lost on either the industry or Ottawa.

Throughout 1941 the oil production rate of the Turner Valley Field declined as the ratio of gas production to oil production rose steadily. This was a clear indicator of the continuing drop in the efficiency with which the reservoir energy was being used. Production from the field peaked at 22 000 barrels per day in 1942. A year earlier, the Board had hired Dr. George Granger Brown to study the Turner Valley Field and to recommend an efficient producing rate for it. When the "Brown Plan," as it came to be called, first was implemented, the maximum production rate was set at 25 barrels per acre/per day of fluid, measured at reservoir conditions. This rate applied to all wells in the field, including those producing from the gas cap. Thus, a well producing a great deal of gas but little oil would soon use up its monthly quota and have to be shut in. Conversely, a well producing mostly oil could continue producing for most of the month. Thus, in this early-day ruling, the Board first established the framework it would build upon for years in conserving reservoir energy and improving oil production.



Board CEOs in the formative years; (left to right) J. Frawley, who worked on the original legislation; E. H. Boomer (1943-45), A. G. Bailey (1945-47), Ian McKinnon (1948-59).

When the United States first entered the War in 1942, Robert Allen was called home to help manage his nation's wartime petroleum supplies. Once again Jimmy Frawley took over as Interim Chairman until a suitable replacement could be found. Dr. E. H. Boomer assumed the chairmanship in 1943, followed by A. G. Bailey from 1945 to 1947. Mr. Bailey left the Board to become a very well-known Alberta oil developer. His departure led to the appointment of one of the Board's most influential chairmen, Ian McKinnon, who served from 1948 to 1959.

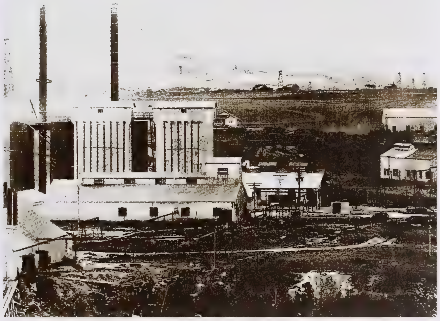
Board engineers doing bottom-hole testing in the early 1940s.

Focus: Accurate information

From its earliest days the Board had tried to gather accurate information about every oil and gas well in the province in order to build a representative picture of the province's geology and energy resource potential. However, many of the smaller oil and gas producers did not have the expertise, for example, to conduct the accurate bottom-hole tests necessary to the data gathering. Nor did they have any confidence in the reliability of tests done by competing producers who did have that capability. As a result, the Board had to own and operate its own bottom-hole testing equipment right up until the 1960s.

"The information we were after was so important that you went to those oil and gas batteries regardless of the condition of the roads or the weather," recalls Calgarian Lloyd Hicklin. "We were very hard on vehicles in those early days." Mr. Hicklin joined the Board in 1943.

Hicklin recalls, "It was normal practice, in the '40s and '50s, to drill the first part of the hole with a cable tool rig and to then move on a rotary rig to finish the well. It wasn't uncommon to take as long as a couple of years to finish a well. The drilling depth to the oil zone was in the order of 8000 to 9000 feet. In the gas cap areas — where they were drilling for gas and condensate — the depth was about 7000 feet. Today, they drill those kinds of wells in roughly 40 days."

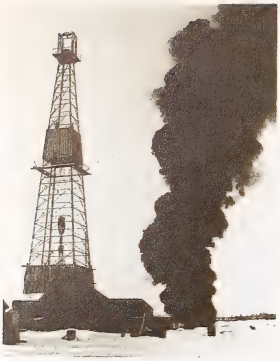


◁◁ Geologist studying all-important seismic data in the mid-1940s.

◁ Alberta's first sour gas processing plant — Turner Valley in the late 1920s.

By 1943, more than 1000 oil and gas wells had been drilled in Alberta. Not many wells by today's standards, of course, but a lot at the time. Alberta's reserves of natural gas had already fallen to 100 years' supply, at the then-small rates of consumption, compared to the 200-year reserves that had been claimed during the 1930s. However, large discoveries still were waiting to be made at Jumping Pound in 1944, Leduc-Woodbend in 1947 and Pincher Creek in 1948.

Although Alberta's first plant processing sour gas (i.e. gas containing hydrogen sulphide) had opened in Turner Valley in 1925, industry's understanding of hydrogen sulphide, and of the equipment for handling it safely, was still in its infancy. Lloyd Hicklin recalls losing two pressure-recording devices down a well in the Jumping Pound Field when he tried to lower them on steel cables to run bottom-hole tests. Both times the cables broke! Tests at the University of Alberta revealed that the sour gas was causing the wires to become brittle in just the short time it took to lower the gauges down the well.



Leduc changed Alberta forever!
February 1947, near Edmonton.

By 1946, production of light oil in Alberta was too low to satisfy even Western Canada's needs. Exports were practically non-existent at that time. Indeed, refineries in Calgary were considering importing oil from the United States. As might be expected, the tempo of exploration activity increased after the end of the war, but up until 1947 no one had found significant quantities of oil in the shallow Mesozoic rocks (64 to 245 million years old) which were the focus, then, of most exploration activity.

And then it happened! At 4 p.m., on the afternoon of 13 February 1947, Imperial Leduc #1 blew in with light oil at 5000 feet from the Devonian System of the Paleozoic.

A new era of growth and prosperity had come to Alberta!

The Leduc Decade ...Applying the Learning to Really Big Challenges

Oil industry optimism led the way

"It wasn't until Leduc in 1947 — and Redwater the next year — that there was any real recognition of the size of the province's oil and gas resources," Mr. Manning reminds us. "Before that time, some of the companies had spent a lot of money on geophysical exploratory work, and there had been a lot of optimistic talk. But nothing tangible seemed to be coming of all the work and talk. Imperial Oil had spent millions on exploratory work prior to Leduc and, indeed, was just about to give up. As I recall it, they were going back over holdings they had already given up on when they struck oil in the deeper Leduc formation. All along, the Government had been very interested, of course, and very hopeful that large petroleum resources would be found. In those days the province was in a very difficult financial position. For all practical purposes the province was bankrupt in the mid-1930s. In fact, we were in default for over $60 million in bonds at one point. However, our hope always was tempered with a natural caution, for we had nothing on which to base our hopes other than the conviction of a few oil industry optimists that the oil was there, if they could just find it."

"There was a great whoosh and it threw a big, beautiful smoke ring. It stopped a second, whooshed again, and then threw another big smoke ring. Those smoke rings would be called pollution today, but they didn't bother us back then," recalls Imperial Oil's Vern Hunter about that day in February 1947 when Leduc #1 blew in.

With the Leduc discovery began the greatest oil and natural gas boom ever experienced in either Alberta or Canada. The rush to find more Devonian reef oil fields was on. **More than 3700** wells would be drilled in the Province in less than 5 years.

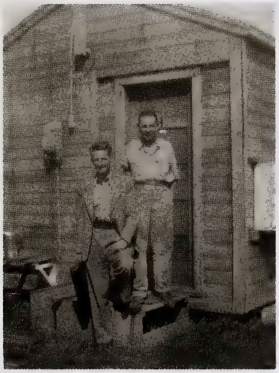
Atlantic #3 blowing wild in 1948. Proof positive of riches below.

Within a year of Leduc an even more prolific oil field was discovered at Redwater. Then — as if to convince those people who still did not appreciate the size of the new discoveries — Leduc's Atlantic #3 well blew wild in March of 1948, providing 10 000 barrels of new evidence each day. In September, shortly before Atlantic #3 could be capped, it caught fire — with MovieTone News capturing the scene for moviegoers all over the world. Thick, black smoke billowed high over the Leduc Field, emphasizing to Albertans and to faraway investors that the sedimentary reefs 5000 feet below the Alberta prairie did indeed hold prolific deposits of oil and natural gas.

And then the rush was on!

Within 4 years of Leduc, other Devonian reef discoveries were made, including Golden Spike, Stettler, Fenn-Big Valley, Wizard Lake and Bonnie Glen, all famous Alberta oil patch names today. Oil production in Alberta shot up from less than 9 million barrels in 1947 to 63 million barrels in 1951, and construction began on the first major pipeline system to carry the oil to Ontario refineries and eastern markets. Prior to construction of this pipeline, Alberta oil had been moved to both eastern and western markets by tank car, a slow and expensive process.

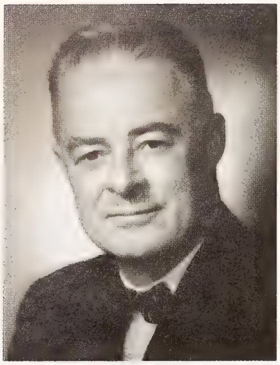
Then the Pembina Cardium Sand oil field was discovered in 1953. Over the next 5 years that field grew to become one of the biggest in North America. The nearby town of Drayton Valley changed from a small bush encampment to a town of 2000 almost overnight, heralding the kinds of changes that would soon impact many small Alberta communities.



Board's first office in Redwater.

The Petroleum and Natural Gas Conservation Board responded to this unparallelled growth by opening offices in Leduc, Devon, Redwater and Stettler. By way of example, the Board's Redwater office opened in the spring of 1949. "It was housed in a second-hand 10- by 20-foot skid shack plunked down in an open field," recalls Frank Manyluk, who worked for the Board from 1945 to 1980. "That beat-up old skid shack had served as the Board's first office in the town of Leduc before it was moved to Redwater."

"In Black Diamond, we had what was known locally as the 'Conservation Board House'," recalls Bert Corey, one of the first engineers to serve with the Board. "We were all single fellows, so we all lived and worked together in this one house. We 'batched it,' as they used to say, and we ate at Mrs. Blue's Welcome Inn."



Dr. George Govier, Board Chairman through the very challenging '60s.

Focus: Market Prorationing

At the urging of the independent oil producers, the Alberta Government passed legislation in 1950 giving the Board the power to share out (or prorate) the available markets for Alberta oil among all producers. This was because the huge volumes of oil produced from Leduc, Redwater and the other new fields had quickly saturated local markets, while the opportunity to capture more distant markets was still being handicapped by limited pipeline capacity. George Govier (the same Dr. Govier who later became Board Chairman), assisted by Douglas Craig (another reservoir engineer who later became a very influential Board Vice Chairman), drafted a proration formula providing for economic and orderly well spacing and direct rewards for improving oil recovery. The Govier/Craig formula also incorporated provisions from the Brown Plan that ensured equitable withdrawal of the resource and prevented the rampant "rule of capture" from taking hold in Alberta as it had in the Texas and California oil fields. With modifications, this progressive system for sharing markets and promoting conservation, at one and the same time, still is in use today.

"The Board also had a very competent engineering staff," recalls Mr. Manning. "On the whole, I think they had the confidence of the industry, particularly during the period of rapid development following the Leduc discovery in 1947. That was the period — under the chairmanship first of Ian McKinnon (1948 to 1959), followed by George Govier (1962 to 1978) — when the Board was constantly dealing with applications for change in the regulations respecting development, export and marketing. Considering the contentious matters they were dealing with, the Board was very successful in retaining the confidence of the industry. Overall, I think the Board was regarded then as being a fair, impartial and capable regulatory body, a reputation that continues to this day."

The 1950s in Alberta were not just years of great oil and gas activity and increasing production. This was also the period when better understanding of the behaviour of the oil and natural gas reservoirs was developed, along with improved conservation practices, more sophisticated recovery techniques and better measuring devices. As then-Board Member, George Govier, told a CBC radio audience in December of 1955, "So striking have the technical developments been that it is a blessing we are only now discovering Canada's greatest oil and gas resources, when our understanding of the recovery process is at least approaching adequacy. What a tragic thing it might have been had Alberta's Leduc Field been discovered 50, or even 20 years ago!"

Focus: Gas Exports

Meanwhile, in 1949, the Board had been given responsibility for issuing gas removal permits, subject to the approval of the Alberta Cabinet. Under this new Act, removal permits could only be issued for gas which was judged to be surplus to Alberta's own requirements for the next 30 years. With this new legislation, the Board became responsible not only for assessing the Province's gas reserves, but also for determining its long-term requirements for natural gas.

By 1953, Alberta's natural gas reserves totalled 12.1 trillion cubic feet, sufficient to last 180 years for the rapidly-expanding provincial markets estimated at that time. Then, in 1954, a dramatic shift resulted from the Alberta Government's decision to approve the removal of 4.35 trillion cubic feet of gas, over a 22-year period, to eastern Canadian and U.S. markets. This decision caused what turned out to be one of the most furious debates ever waged in the Canadian Government, a debate focussed around the building of the TransCanada Pipeline from Alberta to Ontario, and beyond into the United States.

At the same time as it recommended approval of the permit to TransCanada Pipelines, the Board also recommended to the Alberta Government the establishment of Alberta Gas Trunk Line Company (AGTL), which was approved to "gather and transmit gas within the Province." This afforded the Province a means of orderly and efficient development of the resource, while retaining control of the point of transfer to out-of-province markets. AGTL (or NOVA Corporation of Alberta, as it is now called) began operations in 1957. Besides supplying natural gas to Alberta communities, AGTL operated the pipeline network to deliver export gas to both the TransCanada Pipeline and to the Westcoast Transmission line which reached into markets in southern British Columbia and the northwestern United States.

It was construction of the AGTL pipeline network throughout Alberta that made economic the conservation of much of the solution gas which is dissolved in and produced along with oil. Until then, most of this solution gas simply had to be flared, except during the winter months when some of it could be sold here in Alberta for home heating. Now, with the availability of pipelines to move the solution gas, flaring was rapidly curtailed. Today, about 90 per cent of all the solution gas produced in Alberta is conserved and profitably marketed.

The TransCanada Pipeline begins creeping east to major Canadian and U.S. markets.

Focus: The Environment

It was during this same period that increasing attention was being devoted by the Board to preventing environmental damage from oil field operations. Storage of oil in pits was prohibited, and storage tanks at production facilities had to be diked to contain and limit the effects of oil or salt water spills. Surface casing requirements now had to have regard for protection of fresh water acquifers, and disposal of salt water to pits was strictly limited. Also, despite a lack of markets for sulphur, Alberta's sour gas processing plants were required to meet increasingly stringent sulphur recovery requirements.

In a situation that would bring swarms of inspectors around today, these men are working knee-deep in escaping oil.

Thus it was that with the discovery of huge oil and natural gas reserves in Alberta, and the building of trans-continental oil and gas pipelines to eastern, western and southern markets, the Province became, by the late 1950s, the major supplier of oil and gas to the rest of Canada and to major markets in the United States.

"I think we were very fortunate, from the outset, in having capable men heading the Board and capable men on the Board, going right back to Bill Knode," says Mr. Manning. "Ian McKinnon, for example, was a very capable administrator. It was during his term as Chairman that many of the Board's regulations and methods of operation in the field were thought out and set down. We lost Ian McKinnon when we loaned him to the Federal Government in 1959 to help with the establishment of the National Energy Board. We loaned him to Ottawa, but never got him back."

Applied Conservation ...Understanding Alberta's Energy Resources

"Is an oil and gas conservation agency really necessary?" Dr. George Govier asked himself back in 1966 when he had been Board Chairman for nearly 4 years. "Modern industry is enlightened. It has competent people. It is conducting and applying research. And, it seems aware of its responsibilities to society as well as to its shareholders."

In retrospect, it seems almost as though Dr. Govier had come to believe that Alberta's energy industry had matured to the point where it could be counted upon to develop the resources safely and efficiently, without Government supervision. In his early days as Board Chairman, Dr. Govier saw the Oil and Gas Conservation Board (it had been renamed in 1957) as having two vital roles: "First, to provide an environment where an enlightened industry may voluntarily practise good conservation, and where such practice may be encouraged and, if necessary, enforced in those few instances where enlightenment is lacking. Secondly, to maintain pressure for the maximum economically-justifiable conservation; to urge and occasionally to require industry to go somewhat further than it otherwise would in such matters as the institution of enhanced recovery operations, the conserving of oil field gas and the recovery of sulphur."

Focus: Improved Oil Recovery

By 1966 the Board employed a staff of 271, of whom 50 were engineers and geologists. The greatly increased size of the Oil and Gas Conservation Board reflected a changing emphasis in its work. In addition to extensive field testing, measurement checking and facility inspections — all of which were key roles originally established at Turner Valley — the Board was now increasingly participating in detailed reservoir engineering evaluations of oil and gas potential, and in prompting and authorizing enhanced oil recovery (EOR) schemes.

George Govier had become a Board Member in 1948, remaining with the organization until 1978 and serving as its Chairman for the last 16 years of his tenure. In describing what he called "the engineering method", that is "the orderly, dispassionate, planned method of procedure", Dr. Govier was also describing his time as Chairman. Reflecting his leadership during that period, the Board established a strong reputation for engineering excellence and fairness, even among those who sometimes disagreed very strongly with the Board's decisions. As Dr. Govier told an industry gathering in the 1960s, "We are always ready to give a friendly hearing to your petitions, regardless of how unfriendly our ruling on the matter may be!"

Board regulations in the late 1950s and early 1960s promoted increasing emphasis on engineering and research.

Nearly half the Province's oil reserves were subject to waterflood enhanced recovery operations by 1966. These EOR operations resulted in an average oil recovery of more than 40 per cent, almost double what could have been recovered using primary operations alone. Part of the incentive for such widespread use of EOR techniques had come from a revised prorationing scheme implemented by the Board in 1964. Under this new plan, it seldom proved worthwhile just to drill extra wells in order to qualify for extra production without also adding significant reserves. The new plan called for an increased share of prorated production granted on the basis of recoverable reserves. Thus, the new ruling provided encouragement to those companies planning EOR projects. This, in turn, led to a strong emphasis on research and to the establishment of a correspondingly strong engineering base within the industry. The end result was the rapid development of internationally-renowned petroleum research facilities in Alberta and the growth of an equally well-recognized petroleum engineering consulting community, based in Alberta but working worldwide.

The mid-50s to mid-60s also were years of major discovery, including the Swan Hills complex and the Mitsue, Nipisi and Rainbow Fields, with some 6.4 billion barrels of conventional oil being added to Alberta's reserves of 3.1 billion barrels that had been proven by the late 1950s.

Focus: Oil Sands

Despite the rapid growth in Alberta's conventional oil reserves, the Alberta Government also had been quietly promoting development of the huge bituminous sands deposits near Fort McMurray as an alternative petroleum source. A major new component was about to be added to the provincial energy mosaic. A number of unusual proposals were brought forward, including the idea of detonating atomic devices deep underground. Needless to say, this idea quickly fell upon bad times. Instead, the long-tested methods of recovery by mining were the first to reach reality. In 1964, the Board approved construction of the first large-scale oil sands development in the province — the Great Canadian Oil Sands project (now called Suncor) — which was scheduled to commence production in 1967. Shortly thereafter, the Syncrude mining/upgrading project was proposed, received initial approval in 1969 and, after some dramatic political events related to financial terms, went on to be constructed and to begin operations in 1978. These two plants alone have produced nearly 700 million barrels of synthetic crude oil since they began production, and today they provide upwards of 16 per cent of Alberta's total annual oil production.

The dream of extracting oil from Alberta's tar sands began decades before the reality. In this 1936 photo, a steamer and barge stop to pick up miniscule production from an early project, at a dock near present-day Fort McMurray.

Focus: Co-operation

As it had done starting back in the Turner Valley days, the Board continued its direct role in scrutinizing industry operations. While maintaining its unfettered and unique posture of regulating development in the public interest, the Board continued to work closely with the energy industry. Combined "carrot and stick" approaches generated an atmosphere permitting industry, in Dr. Govier's words, "to operate with known, stable, and reasonably sensible rules; rules with sufficient flexibility to provide for special circumstances and rules which, for the most part, are not incompatible with industry's proper desire to minimize costs. Further, the Board recognizes the necessity of industry making a satisfactory profit so that capital may be attracted and generated, research conducted, and proper technical staff engaged, all of which are needed for conservation undertakings."

From its earliest times, but with major emphasis after Leduc, the Board had focussed on requiring industry to obtain the fullest possible set of the basic core samples, logs, fluid analysis and accurate production and pressure measurements needed for performing reliable geological and engineering evaluations. This information, available in hard-copy records, mushroomed in volume with the rapid expansion of oil, gas and oil sands activities in the Province. In order to give easier and more complete public access to the myriad records, the Board began putting its basic data regarding well completions, reservoir properties, well and reservoir production characteristics and production statistics on computer database in the late 1950s. This greatly assisted oil and gas companies in planning future energy developments, as well as significantly aiding the Board's evaluations of the energy applications being submitted to it for approval.

Beginning in the 1940s, the Board had maintained a library of drill cuttings and core samples. Now, in 1965, it formally opened a world-class Core Research Centre housing more than 800 miles of core samples from all across Alberta. The effect of all this data gathering, standardizing, appraising and storing was to enable the ERCB to formulate conservation practices best suited to Alberta's resources, and to wield the technical authority to insist that those practices be adopted by the industry.

Involving Albertans!
...A New Role: Helping People to Understand

In June 1971, the Board once again experienced a name change — this time to the now-familiar Energy Resources Conservation Board — with expanded responsibility for regulating not only oil, oil sands and natural gas, but also coal, pipelines and hydro and electric generation and transmission. Two new Board Members were added that year, bringing membership to five. By then, the Board's staff had increased to 368 people.

Focus: Environmental and Social Concerns

The Board's increasing responsibilities coincided with greatly heightened public awareness during the 1970s of environmental and social concerns. This increased awareness by Albertans centred around the perceived potential for environmental impacts arising from energy developments, as well as the significantly increased effects of energy development on individual landowners.

Prior to 1970, ERCB's hearings had mostly involved only industry proponents or opponents of particular projects, or industry representatives making submissions regarding ERCB policies and practices. However, the public's right to have a say in the manner and direction of energy developments was astir in the Province and, by the mid-1970s, ERCB hearings increasingly involved special-interest groups and individual Albertans. For example, it was during this period that farmers in southeastern Alberta began objecting to oil wells in the middle of their fields, thus interfering with irrigation equipment. That public concern directly led to changes by the Board in oil- and gas-well drilling patterns, with drilling being permitted today usually only at the corners of quarter sections.

In an activity not likely tolerated today, a drilling rig operates within a few yards of buildings on a working farm.

As Others See Us

"...ERCB has played a very important role in the development of the energy sector in Alberta. (The Board's) work has had two major highlights for the farming community. First, the better siting of drilling activities, and the careful locating of processing facilities and power lines, (in order) to provide a climate of reasonable harmony so the two industries may co-exist.

"Second, is the (Board's) continuing increase in requirements for recovering chemicals in order to preserve (Alberta's) atmosphere, and rivers and streams. There still is a need for further strengthening of these regulations and for additional research into the effects of emissions."

— Stan Bell
Farmer, Carstairs

By 1973, Alberta's conventional oil production peaked at about 520 million barrels. Given the number and complexity of energy facilities in the Province, it was recognized that oil spills might occur from time-to-time. In 1971, the ERCB began working with the Canadian Petroleum Association and the Independent Petroleum Association of Canada to co-operatively develop the Alberta Oil Spill Contingency Plan. This plan established 21 industry co-operatives across the Province to work on containing and cleaning up oil spills. These co-operatives — known as OSCARs (Oil Spill Containment And Recovery) — are voluntary organizations made up of the companies operating in each region. Each OSCAR unit files a contingency plan for its area with the Board, and each purchases, stores and maintains the necessary containment and clean-up equipment, including booms to contain oil that is spilled on water, skimmer pumps, boats for use in rivers and lakes, special lighting equipment and many kinds of oil-absorbent materials. Individual OSCARs hold tests of their equipment and procedures several times each year, with the ERCB always present as observers.

Twenty-five years ago getting sulphur loaded and off to market was frequently a power shovel operation, with little regard for the environmental consequences, or worker safety.

As Others See Us

"...Having attended and reported on more major petroleum industry hearings than almost anyone else, I have observed among the Board members...that harmonious blend of technical knowledge and skill, with the keen sense of humour, that is essential in this complex industry...

"The Board has been prompt to change policy when conditions have changed, as in turning prorationing off and on to meet supply and market conditions. It has sometimes been unpopular with the industry, as in tightening the SO_2 emission standards for gas processing plants, but often (those) changes have been made to cope with public concerns that might have been more troublesome without (the Board's) intervention."

— Les Rowland
Contributing Editor, Oilweek, Calgary

Focus: Financial Assistance for People

According to Vern Millard (ERCB Chairman from 1978 through 1986), the public first showed strong interest in becoming involved in Board hearings when major electric transmission lines were being proposed during Alberta's mid-1970s growth period. By the late 1970s, largely as a result of experience gained during public hearings on the Keephills power plant, the Board came to recognize the imbalance, in both knowledge and resources, available to members of the public who were participating in ERCB hearings, compared to those available to industry and Government. It had become increasingly obvious that average citizens would have to have financial assistance if they were going to be able to participate effectively in the Board's public hearing process.

With Vern Millard as Chairman (1978-86), the Board moved to more direct work with Albertans affected by energy developments.

New legislation was introduced in 1978 which required applicants for projects to pay some of the expenses of local interveners at ERCB public hearings. This intervener funding enabled the public to take part in ERCB hearings more fully and on a more equal footing with the energy companies. In a typical year — 1985 for example — the Board received more than 12 000 applications for energy facilities in the Province, the vast majority of these being for wells and pipelines. While most of these 12 000 applications did not present problems for landowners, 34 of them did go to public hearing to consider special concerns and interventions by the public. Thanks in large measure to intervener funding, public participation in those 34 hearings was both well informed and useful.

Focus: Sour Gas

As hydrogen sulphide and sulphur dioxide became increasing public concerns, the ERCB announced tougher sulphur recovery guidelines, first in 1971, and then in 1980, with the guidelines again being actively reviewed beginning in 1985. Even as far back as 1971, there were 66 sour gas processing plants operating in the Province, 42 of them large enough to warrant sulphur recovery. As sulphur recovery capability increased, Alberta became — and continues to be — one of the leading exporters of sulphur to world markets. In 1980, with the world price of sulphur much higher than its decade-earlier levels, the requirements for sulphur recovery were again increased by Alberta Environment and the ERCB, this time requiring an average 98 per cent recovery.

However, the fact remained that there were more and more sour gas plants being built in Alberta and, not surprisingly, this generated increasing citizen concern about emissions from these plants. These public concerns eventually led to a $3.8 million study — known as the Medical Diagnostic Review, or MDR — which was conducted by internationally renowned health professionals and scientists in 1985. The MDR found that people living near two major Alberta sour gas plants were as healthy, or healthier, than people living in a control community located outside the area affected by the two plants. However, a number of residents in the area genuinely believed — indeed, perhaps still believe — that they really were being affected adversely. The MDR study was funded by the Alberta Government and was released for public review in 1986.

Public concerns regarding sour gas finally led to the Medical Diagnostic Review conducted in the Pincher Creek area in 1985.

As Others See Us

"...Throughout its history, and particularly after the Leduc discovery in 1947, the ERCB has maintained a high standard of excellence in the development and conduct of this province's petroleum industry.

"The ERCB has continuously stayed on the leading edge in the development, improvement, understanding and conservation of oil and gas, while at the same time maintaining cordial relations with the industry...

"At the same time, the Board has maintained an open and constructive relationship with the Government of Alberta. It is to the Board's credit that it has developed this fine balance between the industry and the representatives of the people of Alberta. It has responded to the increasingly vocal concerns of the public in recent years with sensitivity and understanding, serving as an agency to promote communications between the community and the oil and gas industry for the betterment of both.

"I am aware that the ERCB has been studied and emulated as a model for other regulatory agencies around the world. As Albertans we can all be proud of such a fine example of a regulatory body...

"Congratulations on the great successes you have achieved over the past fifty years."

— Bill Gatenby, President and CEO
Texaco Canada Resources, Calgary

Public concerns about sour gas deepened as a result of the Lodgepole sour well blowout in 1982. The ERCB Inquiry Panel which investigated that incident made 39 specific recommendations designed to improve Alberta's sour gas drilling practices and to further enhance the safety of people. Most of these recommendations have since been implemented by the industry, the Government and the ERCB. Additionally, the Board has worked with other Government departments to develop a major provincial sour gas emergency response plan designed to co-ordinate Government action and industry action in the event of a sour gas release.

Focus: Serving the Public Interest

Throughout its entire 50-year history, the Board has never lost sight of the public interest which forms such an important part of its mandate. Working closely with provincial industrial objectives, the Board has fostered the growth of a world-class petrochemical industry in Alberta, and has worked to support the manufacture of petroleum derivatives, the generation of electric power from the Province's huge coal resources, the export of Alberta coal and the development of the major infrastructure of drilling, servicing, steel fabricating, engineering and service/supply industries that today place Alberta among the world's leaders in industrial growth.

It perhaps goes without saying that all aspects of life in Alberta have become more complex in the last 50 years. The provincial population has increased from 730 000 in the 1930s, to well over two million today. During the same period, the provincial economy has expanded to include energy, agriculture, forest products, tourism and a host of other industries and businesses. The simultaneous use of lands to support agricultural, forestry, tourism and energy developments — multiple use which is potentially a major source of dispute between people and development companies — today has become almost commonplace in Alberta. While the work of the ERCB has grown significantly in both volume and scope, the Board continues to promote, as one of its most important objectives, the optimizing of Alberta's energy resources while at the same time protecting the environment and promoting the maximum long-range benefits for all Albertans.

Calgary, then and now. Celebrating Canada's 45th birthday in 1912 (left) and downtown at 5th Avenue and 6th Street today, the ERCB's headquarters in the foreground.

"In my view, the three basic principles on which the Board was originally set up are just as valid today as they were in 1938. First, you want to encourage development. The Board has always done this, although I suppose there are those in industry who will complain that any regulation discourages development. I suppose, too, that there will always be members of the public who argue that development never should be encouraged. Such opposing viewpoints are why the Board must remain free of political interference. Secondly, you must protect the public interest. The concept of protecting the public interest has expanded significantly in recent years — particularly in the matter of protecting the environment. However, it seems to me that the Board has been wisely responding to a changing public view of the world in which we all must live and work. Thirdly, there's still the matter of conservation. Conservation of non-renewable resources is even more important today than it was in 1938. Then, we used to say, 'We want all the oil it is possible to develop, but we haven't a barrel to waste!' That's still true today, only now it includes many different kinds of energy resources."

While Mr. Manning declined the opportunity to predict the future of energy development in Alberta by saying, ***"I'm not that crazy!"***, he did wish the Board Members and the staff of the ERCB continued success in the next 50 years — "whatever those years may bring".

The oil industry, then and now. The photo below is believed to be the first oil well drilled in Alberta, near Waterton Lakes, in 1901; at right, hardy souls watch an early-day well test; below right, a modern-day battery of heavy oil wells near Elk Point.

Alberta's Energy Resources

...what they are, what happens to them, and what's left for the future

Alberta serves as Canada's major energy storehouse, having more than 76 per cent of the nation's known reserves of conventional light/medium oils, 94 per cent of its natural gas, 100 per cent of its oil sands/bitumen and nearly 68 per cent of its coal. In this section of **Energy Alberta** we explore how much of Alberta's energy reserves have been developed, produced and marketed, and how much is left for the future.

3. Alberta's Energy Resources (in petajoules)

Remaining reserves at the end of 1987	
Conventional Oil and Equivalent	23 330
Natural Gas and Equivalent	68 500
Bitumen and Synthetic Crude Oil	154 000
Coal	585 000

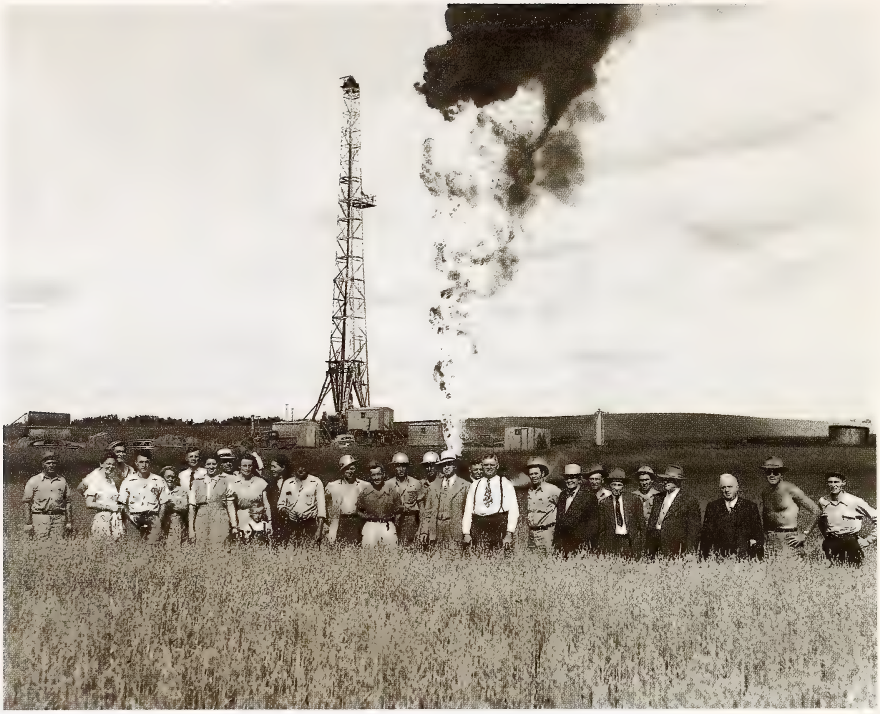
1987 Marketable Production	
Conventional Oil and Equivalent	2 350
Natural Gas and Equivalent	2 850
Bitumen and Synthetic Crude Oil	640
Coal	550
Hydro	5

1987 Sales	To Alberta	To Other Provinces	Exports	**Total**
Crude Oil and Equivalent	680	1 260	1 050	2 990
Gas	640	1 170	1 040	2 850
Coal	353	43	154	550
Hydro	5	0	0	5
Total	**1 678**	**2 473**	**2 244**	**6 395**
Per Cent of Sales	26	39	35	100

Reserves, Production, Sales - an Overview

Drilling for conventional oil and gas increased by 12 per cent during 1987, while drilling for oil sands increased by 41 per cent. The primary focus in the oil and gas industry was again on conventional oil. About 30 per cent of the exploration wells drilled resulted in successful oil discoveries, with another 20 per cent finding gas, for a combined exploration success rate of about 50 per cent.

A number of factors helped to maintain the productivity of conventional production throughout the year. Among these was the increase in infill drilling to sustain productivity in existing pools, as well as the better-than-anticipated performance of wells in new pools. Also, the introduction of the Modified Crude Oil Proration Plan allowed producers to access new markets and encouraged well workover activity.



Forty years ago just about everybody turned out to watch a new well come in. This crowd (including a child) gathered in front of Continental Rig #9, in the Woodbend Field, in 1948.

Conventional Crude Oil

An average of 23 550 oil wells were on production in Alberta during 1987, of which approximately 50 per cent produced by primary depletion, while the remainder produced with some assistance from enhanced recovery methods. Primary depletion refers to the production by using the natural pressures in the reservoir itself, whereas secondary or tertiary depletion involves artificially improving the production process through schemes such as waterflooding or hydrocarbon miscible flooding, respectively.

Enhanced recovery permits a higher overall recovery of oil from the reservoir. These processes require additional capital investment and operating expenses, the most significant of which is the cost of the injected hydrocarbons in tertiary schemes. At the moment, virtually all tertiary schemes require some measure of royalty abatement to make them commercially viable and an acceptable risk.

During 1987, the Alberta oil industry continued to expand with caution following the drastic drop in the price of oil in 1986. Enhanced recovery schemes which were implemented during 1987 tended to be on a smaller scale and less capital intensive than in previous years. The majority of the larger enhanced recovery schemes, which had been delayed in 1986 for economic reasons, did not proceed in 1987. A common strategy, apparent throughout the industry during 1987, was to attempt to improve productivity through small housekeeping kinds of modifications to existing operations. At year-end a total of 739 EOR projects were operating, while 4 schemes had been abandoned for lack of performance.

Oil Sands

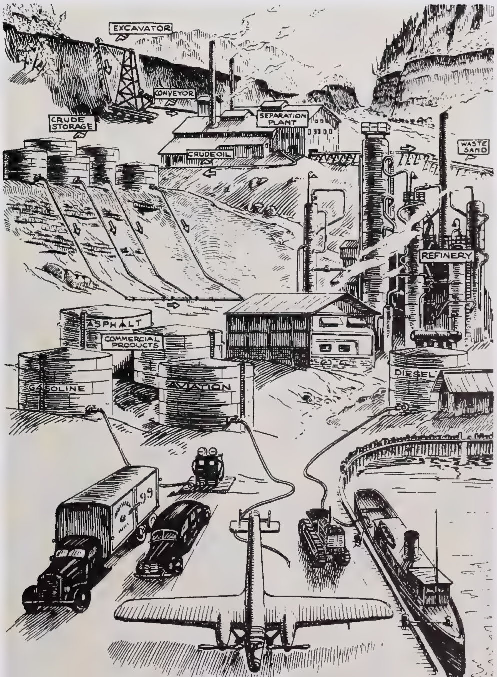
Production from Alberta's oil sands deposits continued to increase in 1987, primarily due to the growth of commercial in situ projects and another banner year for Syncrude's mining project. Commercial in situ and primary crude bitumen production grew to 4.6 million cubic metres (29 million barrels), with the bulk of production coming from the Esso Cold Lake, BP Wolf Lake and Shell Peace River projects, as well as the Dome, Amoco and PanCanadian Elk Point projects.

Experimental in situ crude bitumen production from 26 active schemes added 1.5 million cubic metres, for a total of 6.1 million cubic metres, some 1.4 million cubic metres over 1986.

Synthetic crude oil production amounted to 10.5 million cubic metres (68 million barrels) as a result of Syncrude's record production of 7.9 million cubic metres and Suncor's 2.6 million cubic metres.

Syncrude Canada Ltd. applied to the ERCB in 1987 to expand its Mildred Lake oil sands plant and to extend the production period of the plant by 5 years, through the year 2018. If this application is approved, Syncrude expects to be able to increase its annual production from 8.37 million cubic metres to 10 million cubic metres by 1989, and to further increase its total production to 15 million cubic metres annually, by 1993, from the fully expanded plant.

Estimated cost of the Mildred Lake expansion is $3.9 billion, including a new extraction plant to process additional ore, expansion of the overburden and tailing sands disposal areas and the development of two new mine areas. New hydrocracking capacity will be utilized to expand primary upgrading, and added hydrotreating capacity will treat the additional product through to finished synthetic crude oil. A new hydrogen plant will supply the additional hydrogen required by both the hydrocrackers and hydrotreaters. The expansion would also result in reduced sulphur emissions from the plant.



Back in the 1930s, an artist attempted to show how tar sands would be mined, refined and then moved to markets.

A committee, with representation from all the major parties involved in and affected by the Syncrude application, was formed to review the proposed expansion. With the ERCB as chairman, the Fort McKay Indian Band, Syncrude Canada Ltd., Forestry, Lands and Wildlife, and Alberta Environment met in August 1986 and established the Syncrude Expansion Review Group, or SERG. This group was charged with determining and resolving the major issues and problems arising, including social and economic impacts, employment and business opportunities, technical applications and environmental matters. SERG met a total of 11 times and was successful in bringing together the concerns and objectives of Band leadership, and Government and Syncrude management, to the point where there was a general agreement that the application be approved without specific conditions and that the issues discussed require no further review at a public hearing.

Natural Gas

During 1987, the ERCB was involved in three major public hearings related to natural gas; two of them resulting from market deregulation, the third from the intra-industry conflict about where ethane should be extracted (in the field or at straddle plants on main pipelines).

One of Turner Valley's gas flares turns a pitch black night into day in the late 1930s. Scenes such as this gave the Board its reason for being.

Gas Supply Protection for Albertans

Late in 1986, at the request of the Alberta Government, the ERCB began work leading up to a 13 January 1987 public hearing reviewing the gas supply protection system for Alberta. The ERCB received many submissions that argued its policies should be changed to maintain adequate gas supply protection for Alberta consumers while, at the same time, permitting producers greater flexibility in a newly-deregulated marketplace. In its decision arising from that hearing — as recorded in ERCB Report 87-A, released in March 1987 — the Board reduced the supply protection afforded Alberta's users of natural gas from 25 years for all users to 15 years for core market users only; that is, residential, commercial and small industrial users.

In making its ruling, the ERCB found the existing Alberta gas surplus and deliverability tests to be no longer appropriate in a deregulated marketplace, and not in accord with the 1985 Agreement on Natural Gas Markets and Prices which had been signed by the Governments of Canada, Alberta, British Columbia and Saskatchewan. Continued reliance on the 25-year surplus test, the Board concluded, would inappropriately encourage Alberta consumers — particularly large industries — towards short-term contracts for gas while relying on a mandated surplus for security of supply. The excessive surplus test would be detrimental to producers wishing to sell in expanding markets, and would impede further exploration activity. Also taken into consideration by the Board were such matters as the substantial potential, in the Province, for the discovery and development of new gas reserves, and the longer-term potential for the development of alternative energy sources.

Having achieved broad parameters for gas supply protection for various classes of consumers, the Alberta Government, in July 1987, then requested that the ERCB and the Alberta Public Utilities Board (PUB) jointly inquire into the long-term contractual security of natural gas supply in Alberta and the availability and terms of gas transportation service for Alberta consumers. This Inquiry, held in mid-September of 1987, resulted in a jointly published decision by the two Boards, under the title "Gas Supply and Transportation Service Inquiry".

The recommendations of the two Boards to the Government included the following:

1) that the classes of consumers who should be protected by contracts ensuring long-term supply of natural gas (core market users) should be defined as users whose dependence on natural gas is so fundamental that assurance of supply is always a priority;
2) long-term commitments should be for a period of about 10 to 15 years, should include peak-day requirements in the current year and should include additional protection in the form of back-up supplies;
3) transportation services should generally be available, but core users arranging their own supplies would have to satisfy the PUB that they had appropriate contracts; and
4) that transportation services should be available from either transmission or distribution systems, but in a manner which preserves the sanctity of contracts and municipal franchise arrangements.

Gas Removal Permits Increase

As a result of increasing interest in short-term sales of gas the Board received 209 gas removal applications during the year, as compared to 90 in 1986. However, most of the permit holders attempted to sell into markets which were generally oversupplied with gas, or served by competing energy sources such as fuel oil or electricity. As a result of the competition for markets, prices dropped from an average of $2.10/million Btu ($2.00 per gigajoule) in 1986, to between $1.35 and $1.60/million Btu ($1.28 to $1.52 per gigajoule) in 1987.

In order to market some of the gas being wasted in the Turner Valley, a pipeline was laid to Calgary in 1930, along what is now Macleod Trail.

Ethane Controversy Goes to Hearing

The growing intra-industry conflict regarding ethane extraction from natural gas moved to the ERCB Public Hearing stage in the fall of 1987. Straddle plants have been stripping heavier hydrocarbon liquids from natural gas for many years. Until recently, ethane was left in the gas by producers because there was no other market for it. In the mid-70s, large straddle plants located downstream of the gas fields began to strip ethane from the marketable gas for use in Alberta's growing petrochemical industry. In the early 80s, however, encouraged by the improved economics of enhanced oil recovery (EOR), producers of oil and gas saw a need to strip more and more of the ethane in the field and use it in EOR miscible flood projects. As a result, the petrochemical industry saw a threat of declining ethane supplies at straddle plants and began objecting to most proposals to construct field plant facilities involving ethane extraction. This protracted conflict for the right to extract ethane was a growing concern to both the ERCB and the Government.

On 21 August 1987, the Government of Alberta announced a new policy respecting the production and use of Alberta ethane. The stated goal of that policy is "...to maintain a functioning market in ethane wherein both the petroleum and petrochemical industries will have access to adequate and competitive sources of ethane supply and the incentive for further development of ethane-related activity in the province." The Minister of Energy, the Honourable Neil Webber, requested that the Board consider and report on the policy for protection of threshold volumes of ethane for the Alberta Ethane/Ethylene Petrochemical Project. An Inquiry was held during October, November and December of 1987, and the ERCB's recommendations regarding this difficult matter were submitted to the Alberta Government for approval early in 1988.

Major Focus on the Caroline Field

While oil and gas developments have occurred for more than 30 years in what is now generally referred to as the Caroline Field, 1987 saw two major developments — each in a different geological formation — both of which have brought renewed focus to the area.

In April 1987, Shell Canada Limited received ERCB approval for a 5-year demonstration project which will include the gathering of ultra-high hydrogen sulphide sour gas reserves from the Devonian Leduc formation. The gas will be transported to a processing plant to be located in the Bearberry area, northwest of Sundre. This project will tie two currently shut-in wells, which were originally drilled by Shell in 1969 and 1970, to a processing plant designed to produce liquid sulphur. Shell has estimated the hydrogen sulphide content of the reserves to be in the order of 90 per cent, with total sulphur reserves in the area believed to be between 70 and 100 million tonnes. Shell believes recovery of the sulphur to be only in the order of one-third of maximum potential, using current methods; however, its demonstration project is designed to develop technologies to improve those recovery levels. The plant will be built in modular format so that it may be removed if the demonstration program is not successful. The ERCB imposed stringent safety measures in Shell's permit to recognize the problems identified by the people living in the area. At the same time, the Board complimented both the company and the residents of the Bearberry area on their willingness to work with each other during the development of the project.

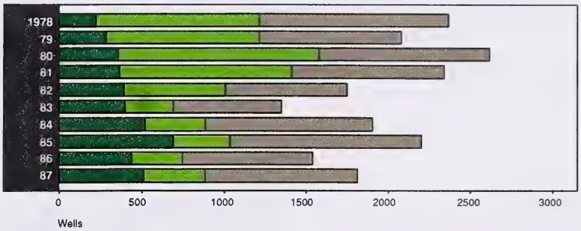
Thirty-five years ago, sulphur actually was bagged by hand for shipment from the sour gas plant in Turner Valley.

The other major development was a large gas discovery in 1986 by Shell in the Swan Hills formation in the Caroline area. Fifteen companies — led by Shell, Canterra and Gulf — are engaged in development activities which are proceeding quite rapidly. The Swan Hills formation produces wet, sour natural gas having a hydrogen sulphide content in the range of 35 per cent. Under the leadership of the three major players and with the encouragement of the ERCB, the companies have sponsored the formation of a citizen group known as the Caroline Gas Field Advisory Board which is now working with the companies to achieve co-ordinated development of the resource, to the maximum benefit and minimal disruption of all parties. Raw gas in place in the Swan Hills formation of the Caroline Field is estimated to be 1.7 trillion cubic feet (47.8958 billion cubic metres), with marketable gas estimated to be 0.6 trillion cubic feet (16.9044 billion cubic metres).

4. Oil and Gas Wells
Exploration

Total exploratory wells drilled in 1987 increased by about 20% over 1986, primarily in search for oil. A success rate of about 50% was experienced in 1987, as it was in 1986.

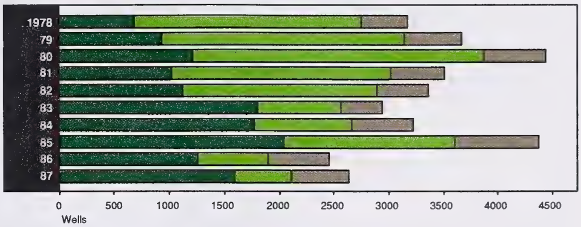
▨ Abandoned and Other



5. Oil and Gas Wells
Development

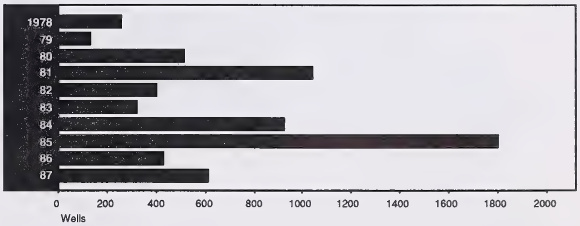
The number of development wells drilled in 1987 increased by 7% over the previous year. The success rate exceeded 80%.

▨ Abandoned and Other



6. Oil Sands Wells

The drilling of oil sands wells in 1987 increased by about 30% over 1986 but remained far below record 1985 levels, reflecting sensitivity to lower oil prices and cautious activity in the bitumen sector.



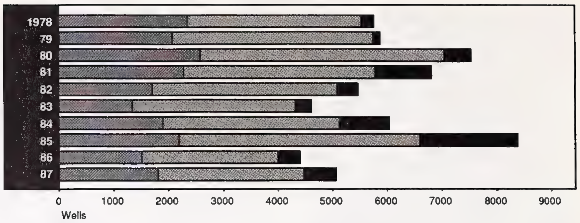
7. Total Wells Drilled

While total oil, gas and oil sands wells drilled remained significantly below record 1985 levels, there were noticeable 1987 increases in all three categories over 1986.

▨ Exploration

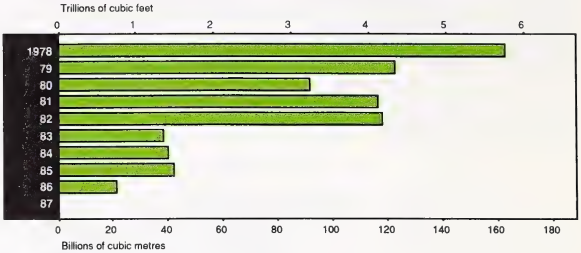
▨ Development

■ Oil Sands



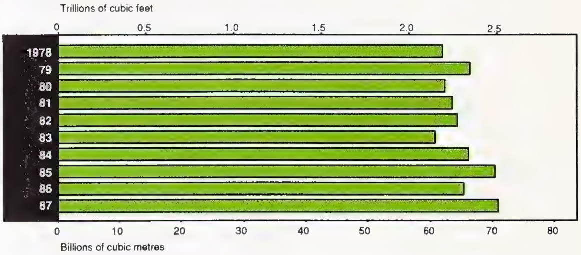
8. Additions to Established Gas Reserves

Drilling for natural gas continued at a very low level in 1987 due to a sluggish market and significant glut in reserves. No net additions to gas reserves were made in 1987 as new discoveries were offset by re-evaluation of reserves in small gas pools.



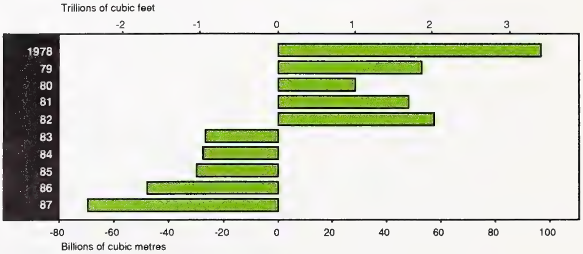
9. Gas Production

Production of natural gas in 1987 increased by about 8% over 1986 levels, returning to the record level of 1985. However, production continues to be considerably less than productive capacity.



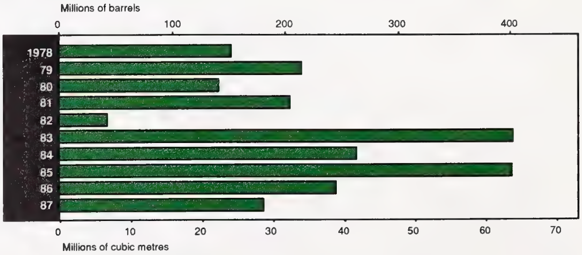
10. Changes in Remaining Established Gas Reserves

The draw-down of Alberta's natural gas reserves continued in 1987, with gas production once again greatly exceeding additions to gas reserves.



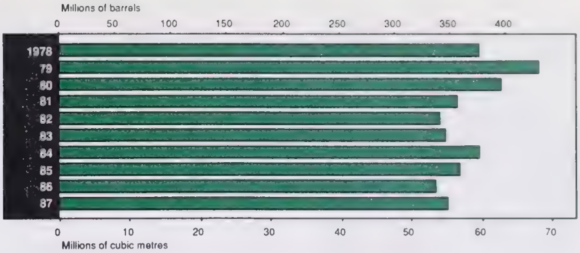
11. Additions to Established Oil Reserves

Despite being at their lowest level in the last 5 years, the 1987 additions to oil reserves remained close to the 10-year average.



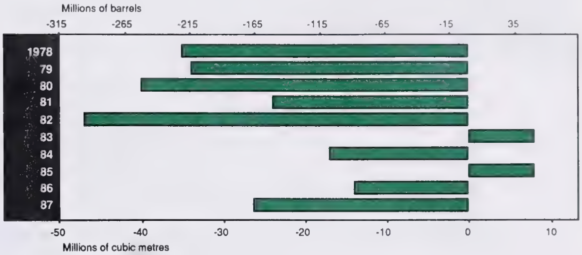
12. Conventional Oil Production

Conventional oil production increased slightly in 1987, due primarily to increased infill drilling and well workover activity.



13. Changes in Remaining Established Oil Reserves

Alberta's conventional oil reserves continued to be drawn down in 1987, with production again exceeding additions, as it has for 8 years out of the last 10.

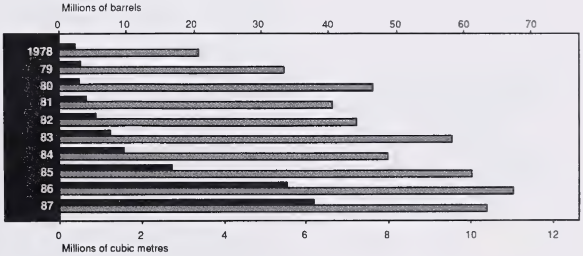


14. Bitumen and Synthetic Crude Oil Production

Production of Alberta's synthetic crude oil from its two oil sands mines decreased slightly from 1986, due to the 1987 fire at Suncor. Bitumen production increased slightly during the year, due to capacity additions at some of the major in situ projects.

■ Bitumen

▨ Synthetic Crude Oil



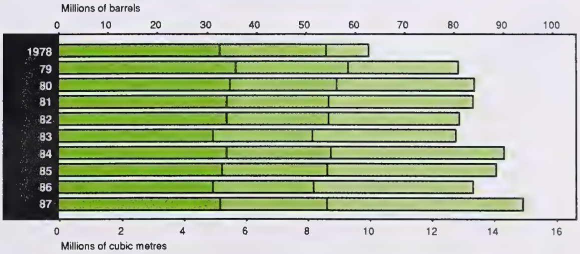
15. Natural Gas Liquids Production

Propane, butanes and ethane are constituents of raw natural gas. Their production increased due to higher gas production and increased ethane recovery.

🟩 Propane

🟩 Butanes

🟩 Ethane

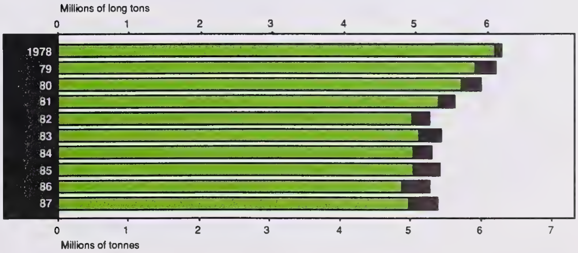


16. Sulphur Production

Sulphur, another constituent of natural gas, also is subject to the swings that occur in natural gas production. Sulphur production in 1987 was therefore higher than 1986, as was gas production.

🟩 Gas Plants

■ Oil Sands Plants



Crowsnest Pass coal miner - 1951.

Coal

Alberta's 1987 production of raw coal increased by 4 per cent over 1986 levels to 28.8 million tonnes compared to 27.7 million tonnes last year. Deliveries of marketable coal increased by 3 per cent to 25.7 million tonnes.

Subbituminous coal deliveries to electric power plants were up 7 per cent in 1987 due to power exports to British Columbia and increased domestic consumption. Bituminous coal deliveries declined by 6 per cent due to cuts in tonnage contracted to offshore markets.

Alberta's remaining established coal reserves continued their growth in 1987, from the 25.9 gigatonnes established in 1986 to 30.6 gigatonnes estimated for 1987, reflecting the high exploration levels of earlier years. At the same time, coal exploratory drilling activity declined in 1987 for the second consecutive year. The main decline in exploration was in the Mountain Region, with the Foothills Region showing slight improvement over 1986.

When measured in energy units Alberta's coal reserves are now nearly four times those of its oil sands reserves.

TransAlta's Highvale Mine in the Wabamun area west of Edmonton — the largest coal mine in Canada — produced a record 12 154 448 tonnes of subbituminous coal for its Sundance and Keephills power stations.

In 1987, the ERCB recommended approval of Fording Coal's Bow City Mine application. The Bow City Mine, located near Brooks, is designed to produce between 100 000 and 300 000 tonnes of subbituminous coal per year for export markets.

During the year the ERCB also issued a mine permit to Luscar Ltd. for its new surface coal mine near Tofield, Alberta. The Tofield Mine will be developed for production of 200 000 to 400 000 tonnes of subbituminous coal per year as markets become available.

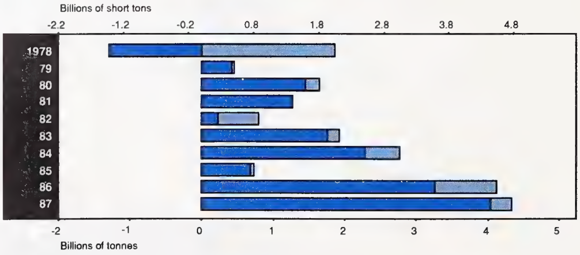
The ERCB gave approval in 1987 to Smoky River Coal Limited for development of its new No. 12 mine.

17. Additions to Initial Established Coal Reserves

In spite of low activity in coal exploration, very substantial additions continue to be made to coal reserves. 1987 saw an estimated 4 billion tonnes of coal added to Alberta's reserves.

🟦 Subbituminous

▨ Bituminous

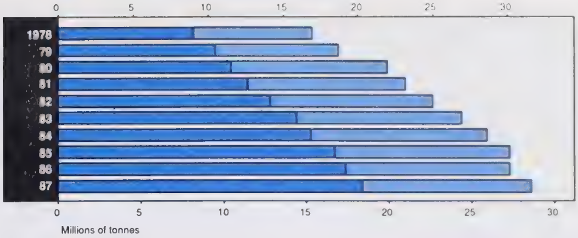


18. Coal Mine Production (Raw Coal)

Alberta's 1987 raw coal production increased by 1 million tonnes over 1986, mostly in the subbituminous category. Alberta's subbituminous coal is shipped to in-province users without being cleaned. Exported bituminous coal must be cleaned before shipping, which results in a 30% weight loss.

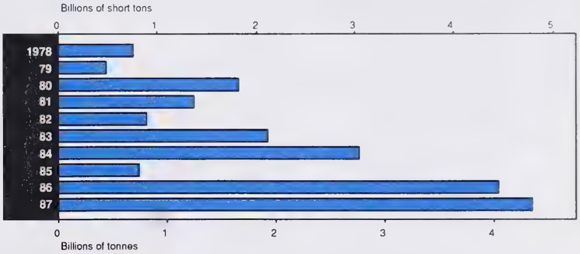
■ Subbituminous

▨ Bituminous



19. Changes to Remaining Established Coal Reserves

More than 4 billion tonnes were added to Alberta's coal reserves in 1987.



Hydro and Electric

Testing the depth of water in the reservoir from a cable car, at one of the hydro plants along the Bow River west of Calgary.

The 1987/88 provincial annual peak electrical load of 5200 megawatts occurred on 7 January 1988. This is a 6.1 per cent increase over the 1986/87 peak load of 4901 megawatts, which occurred on 8 December 1986. The increase is due to load growth that has occurred in the past year, coupled with the relatively cool Alberta temperatures that were prevalent in early January 1988.

A number of electrical transmission facilities were proposed by provincial utilities in 1987. The ERCB approved an application by Alberta Power to construct a direct current converter station and associated transmission line facilities in the Empress area. These facilities will tie in with a new Saskatchewan Power Corporation 240-kV transmission line, allowing for a maximum exchange of 150 MW between the two utilities.

The ERCB also approved a new 240-kV line and related facilities from Valleyview to Peace River which will expand electrical service into the area. Approval also was given for a 138-kV line in the Parsons Creek and Hangingstone areas, and for a 72-kV line between Mildred Lake and the Suncor plant, both in the Fort McMurray area.

During 1987, a number of electric facilities throughout the Province were completed and energized. A 240-kV transmission line, from the Deerland substation (near Bruderheim) northeast to Whitefish Lake and on to Mildred Lake (near Fort McMurray), was completed. This facility provides a 240-kV supply to the Cold Lake area. It also provides an alternative line to the Fort McMurray area, thereby improving that community's reliability of supply. Also, a double-circuit 240-kV line, in the Swan Hills-Valleyview area, was completed and energized in 1987.

A wind-powered electrical generator, owned by A.E. Sinnott of Pincher Creek, supplies power to his cattle operation.

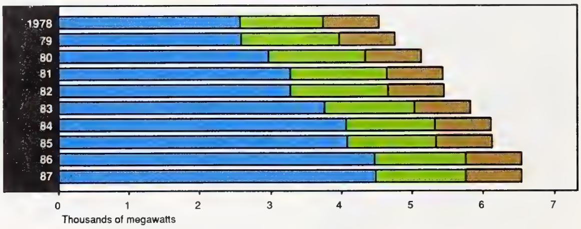
TransAlta completed and energized a number of small electrical facilities during the year, including 138-kV lines in the Redwater, Genesee-Keephills, Enchant, Coalhurst and Whitecourt areas.

Construction continued on a number of modifications to TransAlta's Cascade, Ghost and Bearspaw hydroelectric developments along the Bow River. These modifications are being made to permit these sites to contain and control large amounts of precipitation and snow-melt, which may occur during short periods of time. The modifications include increased spillway capacities, as well as structural maintenance at all three facilities.

Since the early 1980s, there has been a growing interest in Alberta in what is termed "small power production". Initially, that interest related primarily to the installation of small wind-powered electric generators interconnected with the system of an electric utility in the same area. More recently, various firms, groups and individuals have expressed interest in small power generation. A wide range of pricing proposals, terms and conditions of service, and regulatory treatment, have been proposed. This increasing interest in small power production prompted the Alberta Government in 1987 to ask the ERCB and the Alberta Public Utilities Board to inquire jointly into electricity generation by small power generators. A number of interested parties prepared submissions, all of which were considered during an October public hearing. A Government policy respecting small power production in Alberta is expected following the release of the recommendations of the two Boards in early 1988.

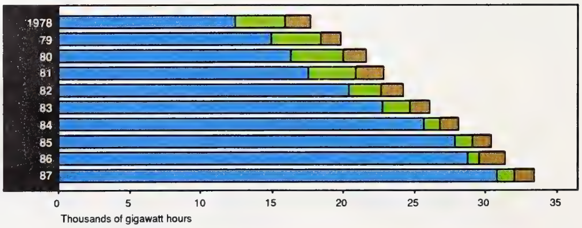
20. Electric Generating Capacity

Electric generating capacity remained constant during 1987.



21. Electricity Generated

Long-term trends in electric energy generated in Alberta continue to show modest growth. The proportion of electrical energy generated from coal continued to increase, and is now more than 90% of the total.



Pipelines

Alberta's pipeline construction was off slightly in 1987, at 6200 kilometres compared to 6800 kilometres in 1986. Overall, however, the year appeared to be one of steady activity, with some promise — in the 2050 permit applications submitted to the ERCB in 1987 — of expanded construction activity in 1988.

The ERCB's pipeline application procedure has been greatly simplified during the past 2 years — with excellent input from affected industry groups — and that work has resulted in the publication of new pipeline regulations in 1987. The simplified procedures, coupled with improved computerized processing, enabled the Board to reduce its Pipeline Department staff while still maintaining an efficient turnaround time for applications.

The revised application process includes the submission, by applicants, of the latest ERCB-produced pipeline location maps. By using these standardized maps, the ERCB is able to speed the posting of up-to-date information on its graphics data base. The Board believes that its pipeline information base not only is very useful to the pipeline industry, but also is a major factor in improving public safety by making this information readily available to all individuals contemplating construction activities involving ground disturbance.

On the technical side, research by an industry group continues into the feasibility of pipelining heavy crude oil in a water emulsion, with some signs that the new technique may prove viable. Internal corrosion is a problem for some segments of the pipeline industry, but a recent development to counteract corrosion involves the use of an expanded polyethylene liner. This technique was first used to refurbish corroded pipelines, but has recently been adopted for new lines to counteract the corrosion problem.

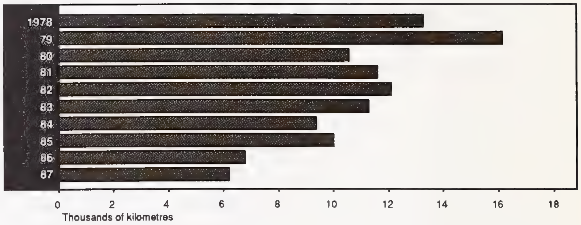
Early-day pipeline construction was labour-intensive. Here a 10-man crew digs the trench for a gas pipeline being installed near Carlstadt, Alberta.

The ERCB's new pipeline regulations now require that all new Alberta liquids pipelines — other than multi-phase and oil-field water lines — must conform to the Canadian Petroleum Association's "Recommended Practice for Liquid Petroleum Pipeline Leak Prevention and Detection". The adoption of these requirements is a positive step forward in controlling pipeline leaks.

For many years the Board has encouraged its staff to participate on industry committees and in industry-related programs in order to keep up to date with events in the energy sector. Typical of this outreach activity is the election, for 1988, of Phyllis Derbyshire of the ERCB's Pipeline Department as president of the Desk and Derrick Club of Calgary.

22. Pipeline Installed
kilometres

Pipeline construction was slightly lower than 1986, at 6200 kilometres, but the 2050 permit applications issued during 1987 may indicate future increases in construction.



Gradually, automation took over in the pipeline industry. This is an early-day steam trencher at work on the Prairies.

Sales and Distribution

...getting energy resources to markets

Several events occurred during 1987 which will continue to have an impact on Alberta's oil industry in the future. Among the most important of these are the Modified Crude Oil Proration Plan (MPP), the expansion of the Interprovincial Pipe Line System, and the ERCB's newly-modified well testing procedures.

One of the most significant impacts on crude oil marketing was the June 1987 introduction of the MPP to replace the proration plan originally introduced in December 1950. This new plan essentially allowed all producers the ability to negotiate firm marketing arrangements, hitherto very difficult due to limited pipeline capacity. This modification to the Alberta proration plan was made possible largely by completion of a major expansion of Interprovincial Pipe Line's capacity to move oil to the eastern part of the continent, and a consensus within the industry that a more relaxed view of market prorationing was appropriate. As a result, Alberta's production of light and medium conventional crude oil was higher in the second half of 1987, bringing Alberta's total production of oil to nearly 78 million cubic metres. Pentanes plus production (a co-product of gas production) also was higher in 1987 due to increased gas production.

Natural gas sales in 1987 were 6 per cent higher than in 1986, with all of the increase being taken by the United States, which experienced an unusually cold winter.

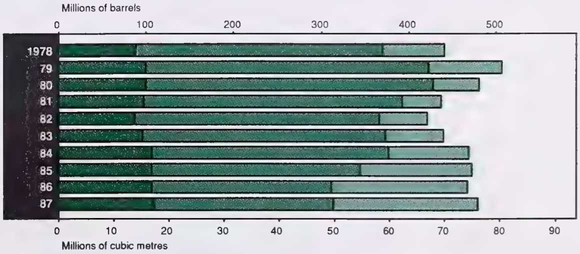
Sulphur sales increased modestly from 1986 levels and stood at close to 6.9 million tonnes. Sales were about 1 million tonnes more than production, which is reflected in a matching decline in sulphur inventories.

Sales of Alberta coal in 1987 were the highest they have ever been, coming in at 25.7 million tonnes. While sales to the rest of Canada and to other countries remained fairly stable over the year, subbituminous coal sales within Alberta increased by about 7 per cent over 1986 levels.

23. Markets for Oil and Equivalent

With the 1987 expansion of the Interprovincial Pipe Line system, deliveries to U.S. markets increased by more than 6%. Deliveries to Alberta refineries increased by 5% over 1986, reaching their highest levels ever.

■ Alberta
▩ Other Canada
▨ U.S.A.



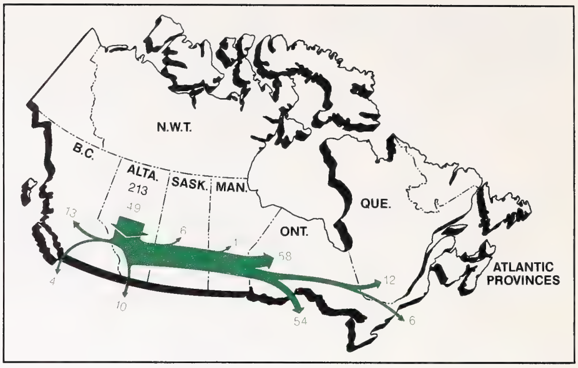
24. Markets for Oil and Equivalent in 1986

Deliveries of Alberta's oil and equivalent increased by about 4% over 1986. Deliveries to British Columbia, Quebec and the Maritimes decreased while Ontario and U.S. markets more than made up the difference.

Legend

Production

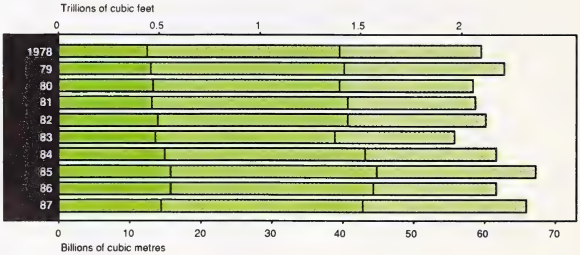
Deliveries



25. Markets for Gas

Gas sales increased by more than 4 billion cubic metres in 1987, due in large part to an unusually cold winter in the U.S.

- 🟩 Alberta
- 🟩 Other Canada
- 🟩 U.S.A.



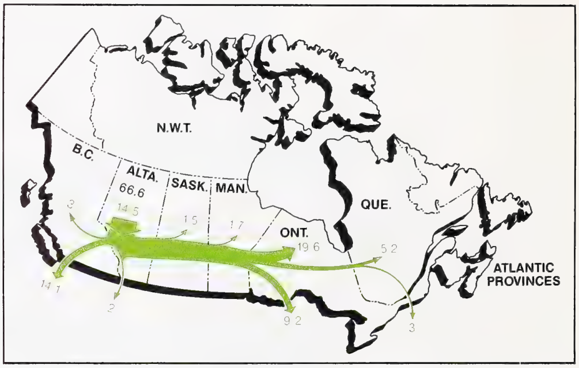
26. Markets for Gas in 1987

Almost 80% of the natural gas produced in Alberta is consumed outside the province, primarily by Ontario and the U.S.

Legend

Production

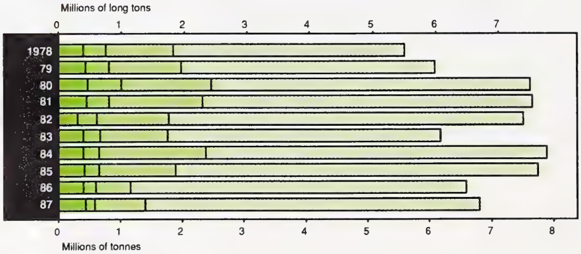
Deliveries



27. Markets for Sulphur

The major use of sulphur is in fertilizer production. Thus, markets for sulphur are largely dependent upon the world agriculture sector. Alberta's 1987 sulphur sales were slightly above 1986 levels. Alberta continues to be the largest sulphur exporter in the world.

- 🟩 Alberta
- 🟩 Other Canada
- 🟩 U.S.A.
- ☐ Offshore

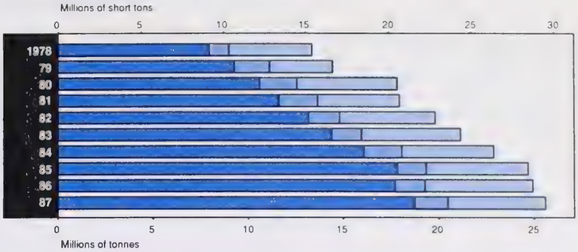


Which way to wealth? A Turner Valley signpost common in the 1940s.

28. Markets for Coal

Alberta's electricity generating industry continues to be the largest single market for Alberta coal.

- ■ Alberta
- ▨ Other Canada
- □ Offshore



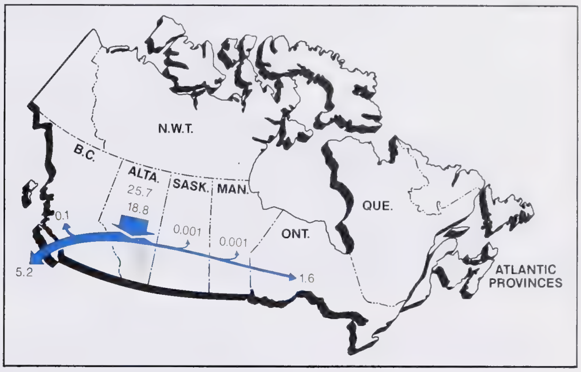
29. Markets for Coal in 1987

Alberta used 73% of the coal delivered in 1987, primarily for electrical generation. Ontario continued to be the second largest Canadian user, taking about 1.6 million tonnes. Exported coal decreased by approximately 1.1 million tonnes from 1986 figures to 5.2 million tonnes, with Japan again the largest single buyer.

Legend

Production

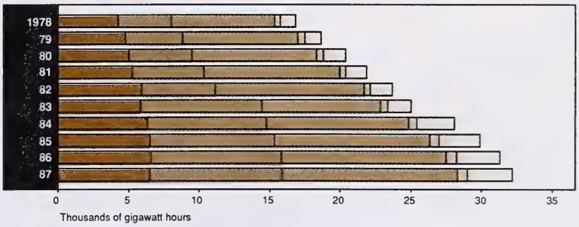
Deliveries



30. Electric Energy Markets

Alberta has the capability to export electric energy; however, only modest amounts were sold to B.C. in 1987. Use of electric energy in all Alberta sectors increased slightly from 1986.

- ■ Residential and Farms
- ▨ Commercial
- ▨ Industrial
- ▨ Transportation
- □ Industrial On-site Generation



Revenues, Investment, Employment

...energy powering Alberta's economy

Sales Revenues

Revenue estimates for Alberta's 1987 energy sales totalled some $17.4 billion, up marginally from the $17.2 billion recorded in 1986, but still significantly below the $27-billion level established in 1985.

Revenues for marketable gas fell by 35 per cent, reflecting the severe impact that surplus gas deliverability in the United States has had on North American prices generally.

Crude oil and equivalent revenues increased by 30 per cent from the previous year, reflecting in part higher production, but also more stable OPEC pricing practices.

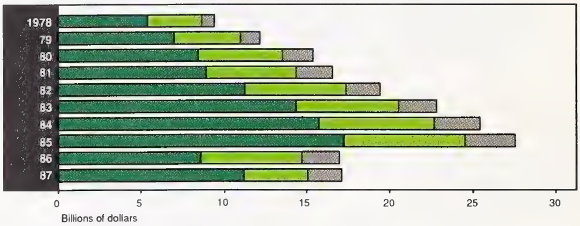
Despite increased sales of sulphur, revenues declined by nearly 20 per cent to $685 million, reflecting a considerable drop in the price of sulphur from the previous year.

Although coal production was up in 1987, revenue was down as a result of a drop in price from an average of $52 (U.S.) per tonne in 1986 to a range between $44 and $50 (U.S.) per tonne in 1987.

31. Gross Revenues
All Hydrocarbons

Despite a near banner production year, 1987 gross revenues from energy sales increased only slightly over 1986, reflecting market price swings. Revenue from oil sales increased significantly, but was largely offset by a decrease in revenue from natural gas sales.

▨ Other



"Let's drink to our future!" Obviously pleased investors gather to toast a new producer.

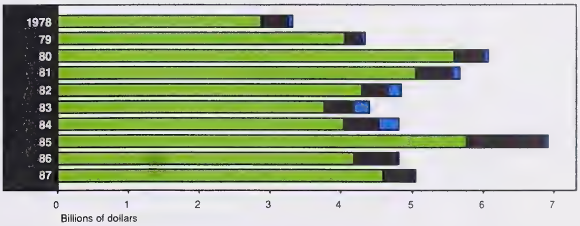
Investment

Investment by the energy industry is affected markedly by swings in the price of each energy commodity. However, despite the uncertainty about oil and gas prices in recent years, the energy industry as a whole was sufficiently confident to increase investment in Alberta by more than 6 per cent in 1987. Thus, investment in the Alberta energy sector rose to $5.1 billion in 1987 compared to $4.8 billion in 1986. Conventional oil and natural gas exhibited similar investment patterns, while investment in oil sands continued its recent downward trend, falling 27 per cent in 1987 relative to the preceding year. Investment in coal continued at a bare replacement level.

32. Energy Investment in Alberta

Investment in the energy sector was up in 1987, primarily in conventional oil and gas activity.

🟩 Gas and Conventional Oil
■ Oil Sands
🟦 Coal



Source: 1978 through 1986 - Canadian Petroleum Assoc., Statistical Handbook; 1987 estimate - Oilweek Annual Review and Forecast; Coal - Statistics Canada Catalogue #61205; 1987 estimate - Statistics Canada.

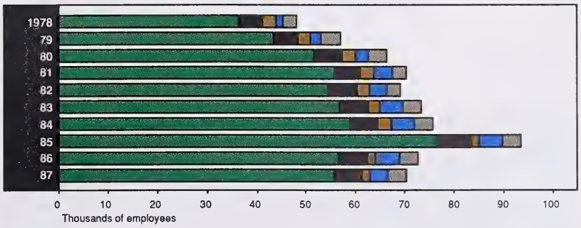
Employment

In 1987, employment in Alberta's energy sector continued a modest decline begun in 1986. Somewhat surprisingly, the number of unemployed seeking work in the Alberta energy industry declined even more sharply, with workers apparently being attracted to other sectors of the Alberta economy and to opportunities in other provinces.

33. Employment in Alberta's Energy Industry

The slight decline in energy employment was a result of companies continuing to respond to the need for cost efficiency in an unstable marketplace.

🟩 Oil and Gas
■ Oil Sands
🟫 Electricity
🟦 Coal
▨ Petrochemicals



Sources: 1977-84 - ERCB Survey; 1985 Oil and Gas Sector - Alberta Energy, Resource Statistics and Intelligence; 1986-87 Alberta Labour Stats. Petroleum category distributed into oil and gas, oil sands, coal and petrochemical. Electricity added to this number to give total.

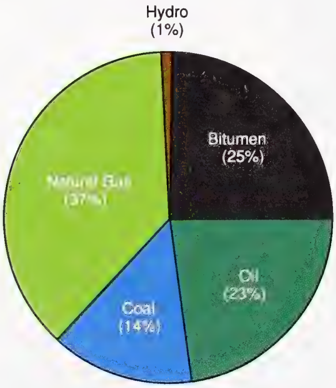
...current production and future trends

Alberta continues to be the major source of energy for Canada and a significant exporter to U.S. and offshore markets. In this section we will focus first on Alberta's own end-use requirements, then on our place in the Canadian energy supply picture and, finally, on our expectations for the future.

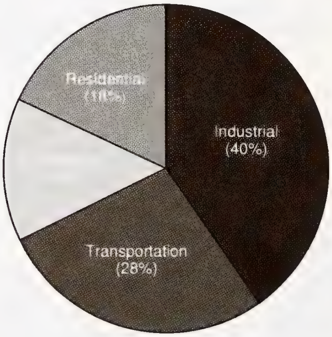
Energy End-use in Alberta

The standard of living and economic activity enjoyed by Albertans, both today and in the future, depends upon a secure and cost-effective supply of energy. Almost all of this required energy currently is supplied from Alberta's own hydrocarbon reserves. Although other sources of energy — such as hydroelectric power, wood, wind, solar and waste energy recovery schemes — do contribute to the Alberta supply, only the hydroelectric generation was significant in 1987. The energy resources used to meet Alberta's own requirements in 1987 are shown in figure 34. The relative "draw" of each end-user category is shown in figure 35.

34. Energy Resources to Meet Alberta's End-use Requirements

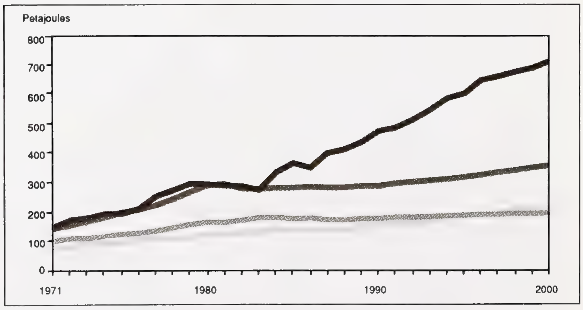


35. End-use Energy Requirements in Alberta



36. Secondary Energy Requirements by Sector

Total residential/commercial energy use rates are forecast to increase slowly, while transportation sector use is expected to grow at a slightly higher rate. In contrast, industrial sector use is forecast to more than double by the year 2000.



- Industrial
- Transportation
- Residential
- Commercial

The industrial sector is clearly the largest single consumer of energy in Alberta. Industrial activity also accounts for a considerable portion of the total energy used for transportation purposes. The ERCB's current forecast, "Energy Requirements in Alberta," suggests that the industrial sector will continue to experience robust growth through the end of this century, thus increasing its share of total energy consumption. This growth is attributed to the continuing trend towards the increased processing of Alberta's raw energy resources here in Alberta, and to the large amounts of fuel consumed in developing Alberta's immense bitumen resources.

The remaining three sectors of the Provincial economy are expected to experience a somewhat lower rate of growth, reflecting improvements in the efficiency of energy use by consumers, balanced against a projected growth in population.

Alberta in the Canadian Energy Picture

Alberta is Canada's major source of energy and will continue to be for many years to come. The major portion of Canada's known reserves of oil, natural gas, bitumen and coal are located within Alberta. Figure 37 below shows graphically the nation's distribution of known energy resources.

Canada continues to rely on Alberta for a major portion of its total energy production. Only in hydroelectric and nuclear power generation is Alberta not a major producer.

37. Alberta vs Canadian Reserves and Production (in petajoules)

Remaining reserves at the end of 1987	Alberta	All of Canada	Percentage Reserves in Alberta
Conventional Oil and Equivalent	23 330	30 800	76
Natural Gas and Equivalent	68 500	73 000	94
Bitumen and Synthetic Crude Oil	154 000	154 000	100
Coal	585 000	860 000	68
Total	**830 830**	**1 117 800**	**74**

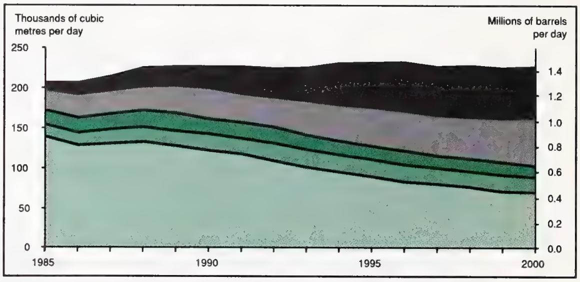
1987 Marketable Production	Alberta	All of Canada	Percentage Production in Alberta
Conventional Oil and Equivalent	2 350	2 880	82
Natural Gas and Equivalent	2 850	3 200	89
Bitumen and Synthetic Crude Oil	640	640	100
Coal	550	1 470	37
Hydro	5	1 140	0
Nuclear	0	250	0
Total Production	**6 395**	**9 580**	**67**

Current Production in Relation to the Future

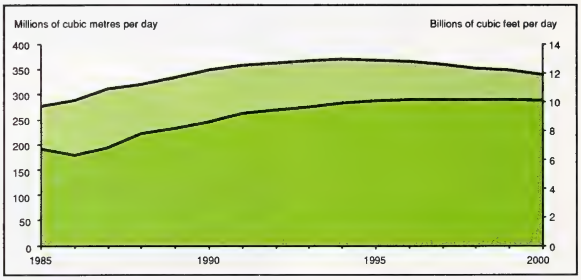
The historic pattern of oil production will experience a considerable change in the future. Conventional crude oil supply is expected to decline to less than half the current levels of production by the end of the century. It is expected that this decline will, however, be more than offset by additional production from new or expanded synthetic crude oil and crude bitumen projects. It is anticipated that price increases should allow synthetic crude oil production to double by the beginning of the next century, and bitumen production to triple in the same time period. While the composition of the total will change, the net oil and equivalent component will remain rather steady over the period (see chart 38).

The prospects for natural gas production appear quite good through to the next century. As new markets continue to open to Alberta gas, actual production will move ever closer to the productive capacity of the industry. In recent years, the natural gas industry has had considerable surplus capacity, a situation which will be somewhat alleviated as we enter the decade of the 1990s.

38. Oil and Equivalent Production 1985-2000



39. Gas Capacity and Production 1985-2000



ERCB Operations

...settling in after a year of major change

The ERCB faced a number of extraordinary challenges during 1987. Among these was the difficult task of maintaining a superior level of service to Albertans and to the energy industry, while reducing both staff and budget. The Board is satisfied that the effort has been successful. Total staff was reduced to 730 from 781 the year before. Through an active early retirement program the organization lost 42 people with more than 1000 years of experience with the organization. Three of the six Board Members retired and were replaced with new appointments by the provincial Government. ERCB expenditures were down more than $3 million (estimated through 31 March 1988) from $42.7 million (1986/87) to $39.4 million (1987/88).

Red Goodall (left) began his career as a toolpush in Turner Valley. As a long-time Board Member, he brought a valued practical mind-set to the theories of oil and gas conservation.

The ERCB continued its emphasis during the year on promoting direct contact and conflict resolution between the energy industry and those Albertans who were being directly affected by energy developments throughout the Province. This important public involvement thrust has seen ERCB field staff directly involved in several hundred public meetings during the year and in countless face-to-face contacts with individual Albertans, particularly in the rural areas. Indeed, as the year drew to a close, the Board agreed to recruit a community involvement specialist to assist its staff with this vital work.

A number of organizational changes were made during 1987 to streamline the work load. Among these was the split of the Development Department into Drilling and Production, and Field Operations. Separate departments of Administrative Services and Accounting also were established.

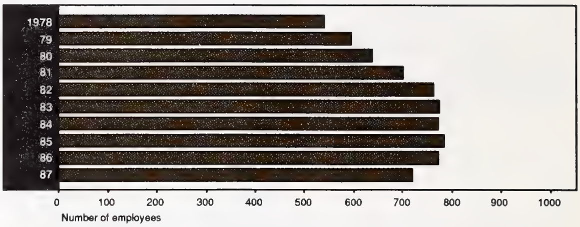
In 1987, the ERCB issued 5426 well licences, including 47 in the critical sour well category, which was about 15 per cent higher than the previous year. Seventeen well blowouts occurred in 1987 compared to 16 in 1986. Only one of the 1987 blowouts involved sour gas. All blowouts were brought under control in short order and without loss of life.

Board Field Staff travelled the length and breadth of Alberta in their cars in the 1940s and 1950s. Vic Bohme (on left) went on to become a long-time Board Member.

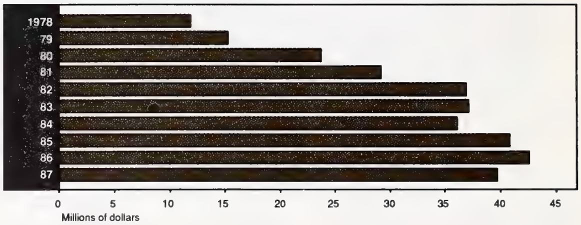
One of the reasons why the early Board Field Inspectors were kept busy; a jerry-rigged oil well, found in the Princess Field by Murray Blackadar.

In a move originating out of the recommendations of the Lodgepole Blowout Inquiry, the Alberta Government and the energy industry — through its Petroleum Industry Training Service (PITS) — have co-operatively opened a $6.5 million world-class well control and pre-employment training facility at Nisku, south of Edmonton. This facility replaces the industry's Golden Spike Training School, which was no longer adequate to handle the complexities of the industry in the 1980s. PITS will operate the new training centre which was paid for, in equal shares, by the provincial Government and the industry. The new facility — which began training oil field personnel in December 1987 — includes well-equipped classrooms, five working wells and a working drilling rig. It will conduct training programs for the drilling and servicing crews who work on Alberta's sour gas and oil wells. The Nisku Training Centre will be formally opened in the spring of 1988.

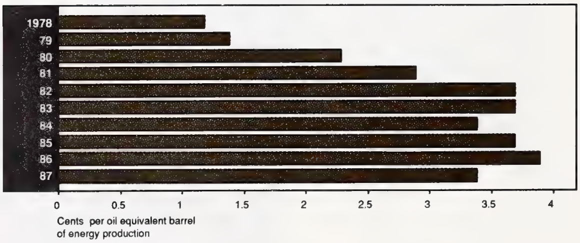
40. ERCB Staff



41. ERCB Expenditures



42. ERCB Expenditure Index



Environmental Issues

...concerns arising from resource development

Protecting Alberta's Environment

...a shared responsibility!

Although protection of Alberta's environment is a responsibility shared by all citizens and corporations as well as by the Government, much of the regulatory work rests with Alberta Environment (AE) and — where the energy industry impacts on the environment — with the ERCB. The ERCB has been concerned with environmental protection for most of its 50 years. By 1972, the environmental work load was sufficient that a separate division was formed within the organization to more specifically deal with these matters, and to work closely with Alberta Environment and other Government departments, with the energy industry and with the public. This division then became a full department in 1980.

Acid gas being flared in Turner Valley in the 1930s.

While researching the ERCB's early-day work on environmental matters, Lynda Holizki, an engineer with the ERCB Environmental Protection Department, spoke with two men who can see the progress we have made since "the good old days". Both were young oil field workers in the early 1950s. Today, one of these men is an expert in the handling of oil spills. He recalled the days when the oil spills simply were permitted to seep into the ground or, at best, were diked and burned, compared with the highly complicated, expensive and successful work of today's OSCAR oil spill units. The second man compared his experiences on an early-1950s sour gas drilling rig with the very successful practices in use today, especially for critical sour gas wells. "Back then," he said with a smile, "the breathing equipment was a handkerchief and the emergency plan was to run like hell!" Adding credibility to his comment, Ms. Holizki discovered, in a dusty 1931 file, this classic oil field understatement from a rig boss reporting to the Alberta Government about testing a new well:

"I enclose herewith daily production (of the well) for this month, which will give you a pretty good idea of what happens when the well is put under test.

"The test came off alright and I think I established to the government's satisfaction that there was quite a leak, either in the casing or from the limestone up. It blew a 2000 pound gauge — a brand new one — all to pieces when it hit 1460 pounds. No one was hurt, as Tommy saw the hands start to vibrate and he started to run, and the way Joe Oswald ran off the top of the derrick was not slow. Joe did not stop until he ran behind the boiler. He ran so fast his shirt-tail was out. He made the fastest time I ever saw a fellow make!"

Ms. Holizki's early-day contact adds, "The only emergency equipment we had back then was the BOP and, of course, special sour-service drill pipe. We hardly ever contacted nearby residents to tell them what we were doing, and more often than not the only real expertise at the site was the tool push.

"Occasionally, big fans were used to blow the escaping gas away from the rig, but the only sour gas monitoring equipment I ever used was my own nose. In those days, well testing really was not very safe. It wasn't uncommon for a man, even when working alone, to take a critical flow prover to a well, crank open the valve and proceed to get a flow estimate. Most of the time he wouldn't have had safety equipment with him, and if anyone else just happened to be around they wouldn't likely have had any first aid, or CPR training either, nor would they have been through any kind of emergency exercises. All these safety practices are required today."

Sour Well Drilling

...the critical focus increases!

Few energy industry activities are perceived to have greater potential for negative environmental impact than is the drilling of a sour natural gas well. This basic fact of life, plus the highly visible 1982 Lodgepole Blowout, resulted in the ERCB and industry co-operating in the development of specialized practices to be used when drilling any sour gas well and particularly when drilling any well designated by the ERCB as "critical". A critical sour gas well is one which has: a) a high potential gas release rate, b) a high hydrogen sulphide content, and c) is located close to centres of population, or close to public facilities such as hospitals, campsites or schools. Since implementing the critical sour well program in 1984, the ERCB has licensed a total of 133 critical sour wells — 14 in 1984, 31 in 1985, 42 in 1986 and 46 in 1987. There have been no serious incidents at any of these wells, a testimonial to how tough and well designed the new practices are. Work associated with these critical wells during 1987 included:

An early 1940s drilling crew. Other than gloves and heavy boots, no safety equipment.

- ERCB field inspections of critical wells being drilled were increased significantly, with 1987's 46 "criticals" being inspected a total of 169 times, compared with last year's 132 inspections on 42 critical wells;
- Contacts with residents living near critical wells were stepped up, and ERCB staff participated in dozens of public meetings during the year;
- The ERCB established an emergency response centre at its Calgary Head Office, to co-ordinate the response efforts of its field staff in the event of a sour gas emergency. Two emergency exercises were held during the year, involving the ERCB, industry and Government staff;
- The ERCB issued a comprehensive new directive to industry (ID 87-2), which deals with the drilling of sour natural gas wells. This directive incorporates much of the work done by industry and the ERCB to make sour well drilling safer and better understood by the public.

Back in the early 1900s even downtown Calgary experienced the flaring of raw gas.

Sour Gas Flaring

...another important focus

During 1987, it became apparent that there was widespread public misunderstanding of the flaring which is a normal procedure in oil and gas well testing or workover operations. (''Flaring'' is the burning of gas present at the wellhead under certain conditions.) This flaring had largely gone unnoticed when it was associated only with sweet gas wells, but it began to arouse major public concern when associated with sour wells. These newly arising public concerns received considerable attention from the ERCB during 1987. To acknowledge these public concerns, the Board reviewed its procedures that are applied to well tests during 1987.

There are several occasions when flaring might occur at a sour gas well — or at any gas well, for that matter. For example, when a well has been successfully drilled it usually is necessary to test it in order to determine its production capability. Also, when the well has been tied into its pipeline and has been producing for a period of time, it may become necessary to clean it up from time to time and re-test it. And, there can be a need to flare the gas if an emergency ever occurs at the well. Any one of these activities could result in significant volumes of gas being flared. For that reason, the ERCB requires industry to apply in advance of the test for a permit to carry out any flaring. Such approvals are typically limited to a fixed period of time and require some environmental monitoring if sour gas is involved; also, the company is asked to alert local residents of the event. ERCB field staff carefully monitor all work associated with the flaring program.

When sour gas is flared, the lethal hydrogen sulphide contained in the gas is converted to sulphur dioxide, which is much less hazardous. This is not to suggest that sulphur dioxide is not dangerous; rather, that under controlled well flaring it is simply much less dangerous than hydrogen sulphide. While it is true that problems can occur during flaring — for example, if the sour gas has water flowing with it, complete combustion may not occur and more hydrogen sulphide than anticipated may be released — it should also be noted that controlled flaring operations can be turned off simply by closing a valve. This is a safe operation and cannot be compared to an uncontrolled flow of gas associated with a well blowout.

The ERCB works to ensure that all flaring operations in Alberta are safe and environmentally acceptable. ERCB staff review all of industry's applications to flare, and the flaring applications associated with critical wells are reviewed by the Board before approval is granted. Board staff check all flaring systems, including flare stack height, which is the critical element for providing better atmospheric dispersion of the sulphur dioxide. The stack height must ensure that ground-level concentrations of sulphur dioxide will not exceed the Alberta maximum ground-level concentration of 0.17 ppm for a measured 1-hour period, recognizing that human health is not endangered by sulphur dioxide until much higher levels occur.

To further ensure human and environmental safety, the ERCB also may restrict flaring to periods of certain wind speed or wind direction. Additionally, the ERCB requires that mobile air monitors be used in any area where critical sour wells are being flared. These monitors measure wind conditions and actual downwind sulphur dioxide concentrations. This requirement of industry frequently is double-checked by the ERCB's own mobile monitoring unit which, if it detects anything unusual, can prompt ERCB field inspectors to check the flare system. These inspectors have the authority to shut down the operation until corrections have been made.

OSCAR

...a BIG name in the oil spill business!

Where oil spills once were more or less swept under whatever "rug" was conveniently nearby, today they become the target of perhaps the most expert, best equipped clean-up team in the North American oil industry. As far back as the late 1960s, an oil spill research facility was established near Edmonton and some of the best minds in the business set out to learn better ways of containing and cleaning up spills of oil and other chemicals. By 1972, the energy industry had established the Prairie Regional Oil Spill Containment and Recovery Advisory Committee and had involved the ERCB directly in its work. Today, the industry has some $4 million worth of specialized equipment which — in times of an oil spill emergency — is operated by teams of well-trained volunteers. This army of volunteers has access to 6 major caches of clean-up equipment (OSCARs) and to 24 smaller caches strategically located throughout the Province.

Occasionally an operator really would try to be environmentally conscious. Here, a pump jack peeks discreetly from its "house."

Alberta's Acid Rain Project Approaches a Milestone

...a world-class effort to protect people and the environment

By the end of the summer of 1988, a team of more than 50 scientists will have completed some of the world's most advanced research on acid rain — with the work being done here in Alberta. (Acid rain is the day-to-day term used to describe acid deposition.)

The Acid Deposition Research Program (ADRP), first launched in Alberta in 1983, is attempting to answer two questions specific to Alberta:

1. **Are there adverse effects of acid-forming gases on Alberta's environment?**
2. **If not, where, when and under what conditions will such effects occur in Alberta?**

When the ADRP results are released in the summer and early fall of 1988, the researchers will be able to discuss with Albertans the ramifications of a wide range of environmental scenarios, using information they have never had before. They will have studied or estimated such specifics as the impacts on yields of crops (such as alfalfa and wheat), the effects on the growth of pine, and changes to soils and waters that are being exposed to varying levels of acid-forming pollutants.

ERCB's Management Team

The last year saw a continuation of the management change begun at the ERCB in 1986. In the latter part of 1987, a sixth Board Member — Emile J. Morin — was appointed by the Alberta Government. Prior to his appointment Mr. Morin had managed the Board's Development Department for a number of years, having first joined the ERCB in 1955.

Board Members

G. J. DeSorcy	Chairman
N. A. Strom	Vice Chairman
C. J. Goodman	
F. J. Mink	
E. J. Morin	
J. P. Prince	

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Administrative Services	K. G. Sharp
Coal	R. G. Paterson
Data Processing	H. Antonio
Drilling and Production	J. R. Nichol
Economics	J. W. Newton
Employee Relations	R. F. Braun
Environment Protection	E. R. Brushett
Field Operations	W. G. Remmer
Gas	J. D. Dilay
Geology	C. A. Langlo
Hydro and Electric	T. F. Homeniuk
Legal	M. J. Bruni
Oil	N. G. Berndtsson
Oil Sands	R. G. Evans
Pipeline	E. G. Fox

The Board wishes to acknowledge, at this significant point in its history, the valued contributions of retired Chairman, Vern Millard, and the long-time Board Members and Managers who also retired in 1987, including Lloyd Bellows and Vic Bohme (Board Members) and Managers Jack Bray, Ken Fuller, Bob Pow and Harry Webber and Board Senior Advisor, George Warne.

Additional information on the ERCB and its activities can be obtained from:

1. Information Services 403-297-8190
2. ERCB Library 403-297-7308
3. Communications Group 403-297-3757
   Senior Communications Advisor - J. K. Bales

All three information sources are located in the ERCB Head Office at
640 - 5 Avenue S.W., Calgary, Alberta T2P 3G4.

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